



HIMACHAL PRADESH STATE REDD+ ACTION PLAN 2020



ICIMOD

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On behalf of



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany





Himachal Pradesh State REDD+ Action Plan 2020

Prepared by

Indian Council of Forestry Research and Education, Dehradun
International Centre for Integrated Mountain Development, Kathmandu
&
Himachal Pradesh State Forest Department, Shimla



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Himachal Pradesh State REDD+ Action Plan 2020



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JAI RAM THAKUR



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HON'BLE CHIEF MINISTER,
HIMACHAL PRADESH, SHIMLA-2



Message

Along with global community, Indian is equally concerned about the impacts of climate change. The integration of mitigation strategies of climate change into the national development planning process in India is steered by the Prime Minister's Council on Climate Change. UNFCCC programme on 'Reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks' in developing countries (collectively known as REDD+) aims to achieve climate change mitigation by incentivising forest conservation in developing countries. In order to take part in this global programme of REDD+, developing countries are required to put in place their National REDD+ Strategy or Action Plans. India joining hands with global community has prepared its National REDD+ Strategy.

Working in close collaboration with MoEFCC and other State Forest Departments, the HP Forest Department is deploying scientific tools and methods for improved ecosystem management and carbon sequestration, forest carbon inventory and reference baselines; designing modalities/programmes for providing better incentives to forest dependent communities for promoting REDD+ activities; and enhancing human and institutional capacity.

I have great pleasure in presenting this "Himachal Pradesh REDD+ Action Plan". I am hopeful that the State REDD+ Action Plan will be a guiding document for effective implementation of REDD+ activities in Himachal Pradesh as per the strategies envisaged in National Strategy for REDD+.

I congratulate PCCF (HoFF) Himachal Pradesh Forest Department and also applaud the efforts put in by the Director General, Indian Council of Forestry Research and Education (ICFRE) for coordinating the preparation of the document.


(Jai Ram Thakur)



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Message

The well-being of our forests is essential for a healthy living environment in the country. REDD+ activities will help in sustainable livelihood of local communities and also in conservation of biodiversity. In simple terms, REDD+ means checking deforestation and forest degradation and also increasing the carbon stocks in the forests by sustainable management of forests. In developing countries, REDD+ aims to achieve climate change mitigation by incentivising forest conservation.

India's National REDD+ strategy is one of the tools to achieve India's commitment to Paris Agreement. The strategy seeks to address drivers of forest degradation and also developing a roadmap for enhancement of forest carbon stocks through REDD+ Action Plan. Paris agreement on Climate change also recognizes role of forests in climate change mitigation and calls upon country Parties to take action to implement and support REDD+. India has communicated in its Nationally Determined Contribution under Paris Agreement, that it will capture 2.5 to 3 billion tonnes of carbon dioxide through additional forest and tree cover by 2030. Thus, forestry sector in India is making a positive cost effective contribution for climate change mitigation.

It is a matter of great privilege that Himachal Pradesh Forest Department in collaboration with Indian Council of Forestry Research and Education has come up with "Himachal Pradesh REDD+ Action Plan". I am hopeful that the State REDD+ Action Plan will go a long way in efficient implementation of REDD+ activities in Himachal Pradesh.

I acknowledge the efforts put in by the HP Forest Department led by PCCF (HoFF) and also thank the Director General, Indian Council of Forestry Research and Education (ICFRE) for coordinating the preparation of this document.

(Rakesh Pathania)



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HIMACHAL PRADESH



Message

The cumulative accumulation of green house gases since industrial revolution has resulted in the current problem of global warming. With increased concern for climate change in recent decades, the emphasis on reducing the GHG emission from deforestation and forest degradation & conservation and enhancement of forest carbon stocks by sustainable management of forests have occupied the centre stage of discussions under REDD+ agenda of UNFCCC. India has communicated its Intended Nationally Determined Contribution to the UNFCCC where in besides reducing the emissions intensity of its GDP by 33 to 35 percent from its 2005 level by the year 2030. India also communicated creating an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. To achieve this huge task REDD+ Action Plan will be an important instrument along with other initiatives being undertaken by the country.

Addressing climate change issues include both mitigation and adaptation. Research in the areas of modeling and biophysical observations as well as socio-economic analysis and policy matters is fundamental for developing science-based policy advice for interventions that promote mitigation and adaptation.

In accordance with the requirements of UNFCCC, Government of India has prepared its National REDD+ Strategy which recognises the role of local and tribal communities in getting fair share of REDD+ benefits. "Himachal Pradesh REDD+ Action Plan" prepared by HPFD in consultation with ICFRE is sincere contribution towards State's preparedness for effective implementation of REDD+ activities as per the strategy envisaged in the National REDD+ Strategy.

I compliment PCCF (HOFF) and her team & Indian Council of Forestry Research and Education for bringing out the "Himachal Pradesh REDD+ Action Plan". I am hopeful that this action plan will serve as a guiding document for effective implementation of REDD+ activities in the state and supplement the efforts of our country in mobilizing result based financial incentives under REDD+.

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FOREST DEPARTMENT
HIMACHAL PRADESH



Message

REDD+ is one of the global climate change mitigation option under United Nations Framework Convention on Climate Change (UNFCCC) which addresses the issues of deforestation, forest degradation and promotes sustainable management of forests as well as enhancement of forest carbon stocks in the developing countries. India has developed its National REDD+ Strategy and National Forest Reference Level in the year 2018 and submitted to UNFCCC. The National REDD+ Strategy focuses on mitigating options in the forestry sector across the country. Forest management leads to biological sequestration of carbon which makes it the most effective and sustainable way to mitigate the ever increasing concentration of carbon dioxide in the atmosphere.

State REDD+ Action Plan for the State of Himachal Pradesh is designed for the implementation of REDD+ activities in the state so that the Himachal Pradesh State Forest Department can integrate its efforts in this direction with the objective of National REDD+ Strategy and contribute substantially to the overall emission reducing target of India as well as in achieving the NDC target of forestry sector.

The recorded forest cover in the state is 27.7% of its geographical area. Forest and tree cover as well as forest carbon stocks of Himachal Pradesh have been assessed to be increasing steadily. However there is still an ample scope to implement REDD+ activities in the state so as to enhance the forest cover further leading to increased carbon stock.

I would like to thank the Department of Forest (Government of Himachal Pradesh), Indian Council of Forestry Research and Education and Himalayan Forest Research Institute, Shimla as well as International Centre for Integrated Mountain Development for providing able guidance in developing the mechanism for formulation of State REDD+ Action Plan. I am sure, implementing this action plan will facilitate accomplishing the targets with the active participation of the communities in the state and contribute towards the goal set by the REDD+ Action Plan at national level.

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Message



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In accordance with the requirements of United Nations Framework Convention on Climate Change (UNFCCC), Government of India has prepared its National REDD+ Strategy in the year 2018. The Strategy recognizes the role of local communities in getting fair share of REDD+ benefits. The National REDD+ Strategy of India outlines the facilitative and enabling environment for implementing REDD+ activities and devolves major responsibility for execution of REDD+ activities to the State Forest Departments.

Forests hold immense potential to mitigate and adapt to the challenges posed by climate change. Himachal Pradesh, a hill state with its wide expanse of lush and evergreen forests and abundant natural resources, presents immense opportunities for implementation of REDD+ activities, which seeks to incentivize communities not only for reducing deforestation and forest degradation but also for conservation, sustainable management of forests, and enhancement of forest carbon stocks.

ICFRE in collaboration with ICIMOD and Department of Forest (Government of Himachal Pradesh) has prepared State REDD+ Action Plan (SRAP) for the state of Himachal Pradesh through multi-stakeholder's consultation processes under trans-boundary REDD+ Himalaya Project. Himachal Pradesh SRAP prioritized the drivers of deforestation and forest degradation, and barriers for enhancement activities. It devised necessary intervention packages for addressing the drivers and enhancement activities. SRAP will be helpful in implementation of the National REDD+ Strategy and getting the carbon and non-carbon incentives under REDD+ mechanism.

I am hopeful that the Himachal Pradesh State REDD+ Action Plan will serve as a guiding document for implementation of REDD+ activities and mobilizing the result based financial incentives. It will also be a guiding document for the other states to develop their SRAPs.

I compliment the team of experts from the ICFRE, ICIMOD and Himachal Pradesh State Forest Department for preparing the Himachal Pradesh State REDD+ Action Plan under REDD+ Himalaya Project.

(Arun Singh Rawat)

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Content

Abbreviations	xvii
Acknowledgements	xviii
Executive Summary	xix
1. INTRODUCTION	01
1.1 REDD+ Readiness of India	02
1.2 State REDD+ Action Plan: An Approach for Operationalisation of National REDD+ Strategy	02
1.3 Linkages of India's Nationally Determined Contributions (NDCs) and SDGs with SRAPs	03
2. HIMACHAL PRADESH: A Contextual Background	05
3. METHODOLOGY AND PROCESS	09
3.1 SRAP Summary	09
3.2 Workshop for Preparation of Himachal Pradesh State REDD+ Action Plan	09
4. DIAGNOSTIC ANALYSIS AND PLANNING	11
4.1 Prioritization of Drivers of Deforestation and Forest Degradation, and Carbon Enhancement Activities	11
4.2 Problem Trees and Solution Trees: Important for Theory of Change Analysis	14
4.3 Development of Intervention Packages	19
4.4 Identification of Strategies and Activities of IPs	20
4.5 Feasibility Analysis of Intervention Packages	22
4.6 Safeguard Analysis of Intervention Packages	23
4.7 Gaps Analysis	24
4.8 Monitoring	25
5. BUDGET AND OPERATIONAL PLAN	27
REFERENCES	29
ANNEX 1 List of participants of multi-stakeholder consultation workshop for preparation of Himachal Pradesh State REDD+ Action Plan	30
ANNEX 2 List of participants of expert consultation meeting for preparation of Himachal Pradesh State REDD+ Action Plan	32
ANNEX 3 Relevant stakeholders of Himachal Pradesh	33
ANNEX 4 Ranking of Deforestation & Forest Degradation Drivers and Enhancement Activities	35
ANNEX 5 Problem Trees	37
ANNEX 6 Detailed Intervention Packages with Monitoring Plan and Budget	41





Abbreviations

D&FD	Deforestation and Forest Degradation
DPR	Detailed Project Report
FSI	Forest Survey of India
GHG	Greenhouse Gas
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit (GmbH)
HFRI	Himalayan Forest Research Institute
HP	Himachal Pradesh
ICFRE	Indian Council of Forestry Research and Education
ICS	Improved Cook Stoves
ICIMOD	International Centre for Integrated Mountain Development
IGA	Income Generating Activities
IPCC	Intergovernmental Panel on Climate Change
IPs	Intervention Packages
MDF	Moderately Dense Forest
Mha	million hectares
MT	Million Tonne
NRS	National REDD+ Strategy
NTFPs	Non-Timber Forest Products
OF	Open Forests
PAMs	Policies and Measures
QA/QC	Quality Assurance/ Quality Control
REDD+	Reducing emissions from deforestation and forest degradation, and role of conservation, sustainable management of forests and enhancement of forest carbon stocks
RS&GIS	Remote Sensing & Geographic Information System
SFD	State Forest Department
SRAP	State REDD+ Action Plan
TOF	Tree Outside Forest
UNFCCC	United Nations Framework Convention on Climate Change
VDF	Very Dense Forest



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- All the officers, scientists and staff of HFRI, Shimla
- All the officers, scientists and staff of Biodiversity and Climate Change Division, ICFRE
- All the participants of multi stakeholder's consultation workshop and expert consultation meeting for formulation of SRAP for the State of Himachal Pradesh



Executive Summary

Globally, agriculture, forestry and other land use (AFOLU) activities accounted for around 23% of total net anthropogenic emissions of greenhouse gases. Greenhouse gas emissions from deforestation and forest degradation are reported to be 11% of total emission from AFOLU activities. This brought the necessity of implementation of activities under REDD+ mechanism as climate change mitigation option. REDD+ mechanism is a global effort to create a financial value for the forests favouring conservation, enhancement of forest carbon stocks and sustainable management of forest. This innovative mechanism helps in low carbon paths to sustainable development. REDD+ as an operational element recognises the safeguards and respect the rights of local communities and also protects biodiversity.

To get financial support under REDD+ mechanism, it is required to develop national strategy or action plan, a national forest reference emission level and /or forest reference level, robust and transparent national forest monitoring system and safeguards information system. National REDD+ Strategy and National Forest Reference Level have already been developed by India and submitted to the United Nations Framework Convention on Climate Change (UNFCCC). Development of National Forest Monitoring System and Safeguards Information System are under process. The broad objective of National REDD+ Strategy is to create REDD+ architecture at National and Sub-National levels. The National REDD+

Strategy had laid emphasizes on development of State REDD+ Action Plans for implementation of National REDD+ Strategy at state level.

Indian Council of Forestry Research and Education (ICFRE) in collaboration with International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal is implementing trans-boundary REDD+ Himalaya Project in North Eastern states of India. The project is mainly focusing on capacity building, technology sharing and knowledge dissemination in context of REDD+.

Forest and tree cover of Himachal Pradesh covers 29.21% of the total geographical area of the state. Being a mountainous state of the Western Himalaya, forests have immense potential to make the life resilient by providing food security, water security and quality livelihood to the local communities. The scrub has reportedly increased in 7.28 sq km between the period from 2015-2017.

ICFRE in collaboration with ICIMOD and Himachal Pradesh Forest Department has prepared State REDD+ Action Plan (SRAP) for Himachal Pradesh (HP) through multi-stakeholder's consultation process under REDD+ Himalaya Project. Identification and prioritization of direct drivers of deforestation & forest degradation and barriers to carbon enhancement have been identified through consultation process. Moreover, a set of following Intervention Packages and their constituent activities have been identified for addressing the prioritized drivers of deforestation & forest degradation and barriers to carbon enhancement:

1. Improved management of forest land diversion
2. Minimization of frequency and incidence of forest fire
3. Management of invasive plant species
4. Adequate measures developed for rehabilitation of degraded forest lands and other lands

Apart from identification of intervention packages, feasibility and safeguard analysis have also been undertaken. The main aim of feasibility analysis is to identify the risks and



obstacles for implementation and identifying risk mitigation measures to make them more cost-effective. Safeguards analysis involved checking of each intervention package for governance, social and environmental risks and how to mitigate them and also necessary to meet 'Cancun Safeguards' of United Nations Framework Convention on Climate Change (UNFCCC).

Monitoring protocol and quantification of proxy indicators are another essential component of SRAP. This helps in setting quantitative targets for the outputs and finalising the five-year budget needed to implement intervention packages. The budget involves monitoring activities apart from implementation costs. Budget of Rs. 102 crore is estimated to be required for implementation of activities of the identified intervention packages for addressing the drivers of deforestation & forest degradation and barriers to forest carbon enhancement in the state of Himachal Pradesh.

Himachal Pradesh SRAP will be a guiding document for another five years to accomplish intervention packages in the state which will be helpful in conservation of forests, sustainable management of forest and enhancement of forest carbon stocks. It will also help in obtaining result-based payments, environmental and social co-benefits under the REDD+ mechanism.



1

INTRODUCTION

India, with a geographical area of 32,87,469 sq km is the seventh largest country, and ranks tenth amongst the most forested nations of the world. It has 16 major forest types and 221 sub-forest types (Champion and Seth, 1968). India is one of the among 17 mega-diverse countries and having 4 global biodiversity hotspots. Protected areas include 101 national parks, 553 wildlife sanctuaries, 86 conservation reserves and 163 community reserves covering about 5.02% of the geographical area of the country. India has 28 states and 8 Union Territories (UTs). Each state/UT has its own plan, policies and programmes for development that contribute to the implementation of the national plans.

Forestry sector offsets about 12% of the country's green house gas (GHG) emissions. The forest and tree cover are 80.72 million hectare which is 24.56% of the geographical area of the country. As per the Second Biennial Update Report (BUR II) to United Nations Framework Convention on Climate Change (UNFCCC), the total annual GHG emissions have increased from 2,136.8 million tonnes of CO₂ eq in 2010 to 2,607.5 million tonnes of CO₂ eq in 2014. Land use, land-use change, and forestry (LULUCF) sector

was a net sink of 301.19 million tonnes CO₂ eq. for the year 2014 (MoEFCC, 2018 a).

Moreover, population growth is also posing challenges on the usage of natural resources. To combat climate change, strong mitigation and adaptation mechanisms are required for the sustainable management of forests along with the economic development.

REDD+ is primarily a climate change mitigation effort. However, an effective REDD+ programme will provide a variety of income generation opportunities, livelihood security, resilience and social well being. Ecosystem services provided by forests and their continuous flow are now becoming increasingly important in the context of climate change. REDD+ programmes and actions contribute towards mitigation and adaptation to climate change and at the same time provide financial incentives to the participating communities.



1.1

REDD+ Readiness of India

India has made a significant progress in addressing deforestation and stabilising forest cover through combination of policy measures and forest management activities. Forest degradation adversely impacts the livelihood of forest dependent communities. The likely driving factors of forest degradation may be gap in demand and supply of fuelwood, timber and other non-timber forest produces, encroachments in forest lands, diversion of forest land for non-forestry activities. Through REDD+ approach, India has advocated the basic principle, *i.e.*, one unit of carbon saved is equal to one unit of carbon added (MoEFCC, 2014). Cancun Agreements advocate the implementation of REDD+ activities in a phased approach beginning with the development of national strategies or action plans, policies and measures, and capacity-building, followed by its implementation with capacity-building, technology development & transfer, results-based demonstration activities, and evolving into results-based actions that should be fully measured, reported and verified. National REDD+ Strategy (NRS) and National Forest Reference Level (FRL) have already been developed by India and submitted to the United Nations Framework Convention on Climate Change. Development of National Forest Monitoring System and Safeguards Information System are under process.

The momentum has been generated to facilitate REDD+ at the national level among all the stakeholders with the development of National REDD+ Strategy (MoEFCC, 2018b). The objective of the Strategy is to facilitate implementation of REDD+ programme in the country in conformity with relevant decisions of UNFCCC, Cancun Agreements, Warsaw Framework for REDD+, Paris Agreement, and the national legislative and policy framework for conservation and improvement of forests and the environment. National REDD+ Strategy 2018 encourages undertaking the activities of reducing emissions from deforestation and forest degradation along with conservation and enhancement of forest carbon stocks. Sustainable management of forest is also another important activity of REDD+. National REDD+ Strategy guides and directs the sustainable management of forests and upholding the rights of the local communities on lands and forest products. It underlined the broad institutional framework for implementation of REDD+ activities in India. It also aims for optimisation of forest ecosystem services including the carbon sequestration and adding forest carbon stocks and further reducing pressure on the forests for addressing drivers of deforestation and forest degradation (MoEFCC, 2018b).

1.2

State REDD+ Action Plan: An Approach for Operationalisation of National REDD+ Strategy

The National REDD+ Strategy (NRS) of India had laid emphasis on development of State REDD+ Action Plans (SRAPs) for implementation of NRS at state level. This idea is practically important for implementing NRS at field level. Because of major differences in forest ecosystems and drivers of deforestation and forest degradation (D&FD) at state level. State REDD+ Action

Plan provides the opportunity to address the local and state specific drivers of deforestation and forest degradation and barriers to enhancement of forest carbon stocks while tailoring them with the existing national policies, laws and regulations. This also provides transparency, ownership and sustainability of REDD+ programmes & actions, and allow



participation of all the stakeholders including local community. The SRAP is based mainly on a multi-stakeholder and multi-sectorial consultative process, complemented by spatial analysis using geographical information system, that leads to identification of a set of REDD+ 'intervention packages' and activities that address the prioritized drivers and barriers. There is also a careful analysis of the potential social and biodiversity risks associated with the proposed intervention packages, leading to a set of risk mitigation measures. This makes the SRAP different from other previous forestry plans.

The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety has funded the regional programme "REDD+ Himalayas: Developing and using experiences in implementing REDD+ in the Himalayas". The programme is jointly

implemented by International Centre for Integrated Mountain Development (ICIMOD) and GIZ in partnership with REDD+ focal points in four Himalayan countries: Bhutan, India, Myanmar and Nepal with the basic aim to improve the framework conditions for socially and ecologically appropriate REDD+ measures to mitigate climate change.

ICFRE and ICIMOD in collaboration with State Forest Departments of Mizoram and Uttarakhand have already developed State REDD+ Action Plans for the states of Mizoram and Uttarakhand under REDD+ Himalaya Project. Preparation of State REDD+ Action Plan for the state of Himachal Pradesh has been initiated in the extension phase of the REDD+ Himalaya Project.

1.3

Linkages of India's Nationally Determined Contributions and Sustainable Development Goals with SRAPs

India is one of the countries which actively participating in UNFCCC negotiations especially for REDD+ mechanisms. The policies, laws and regulations are in place in India to address the issues of deforestation and forest degradation and improve forest management activities. Key elements like National REDD+ Strategy and National Forest Reference Level have already been submitted to UNFCCC. India has also submitted its Nationally Determined Contributions (NDCs) under the Paris Agreement in which REDD+ has been stated as an important mechanism for achieving the forestry target of NDC, i.e. creation of an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ eq through additional forest and tree cover by 2030.

In a special report of IPCC named Climate Change and Land stated that reduced deforestation and degradation is one of the options that contribute in climate change mitigation & adaptation, and enhances food security (IPCC, 2019). REDD+

mechanism favours holistic approach and SRAP formation is the first step to address the critical issues and raise the adaptive capacities of the communities depending upon forest for their livelihood.

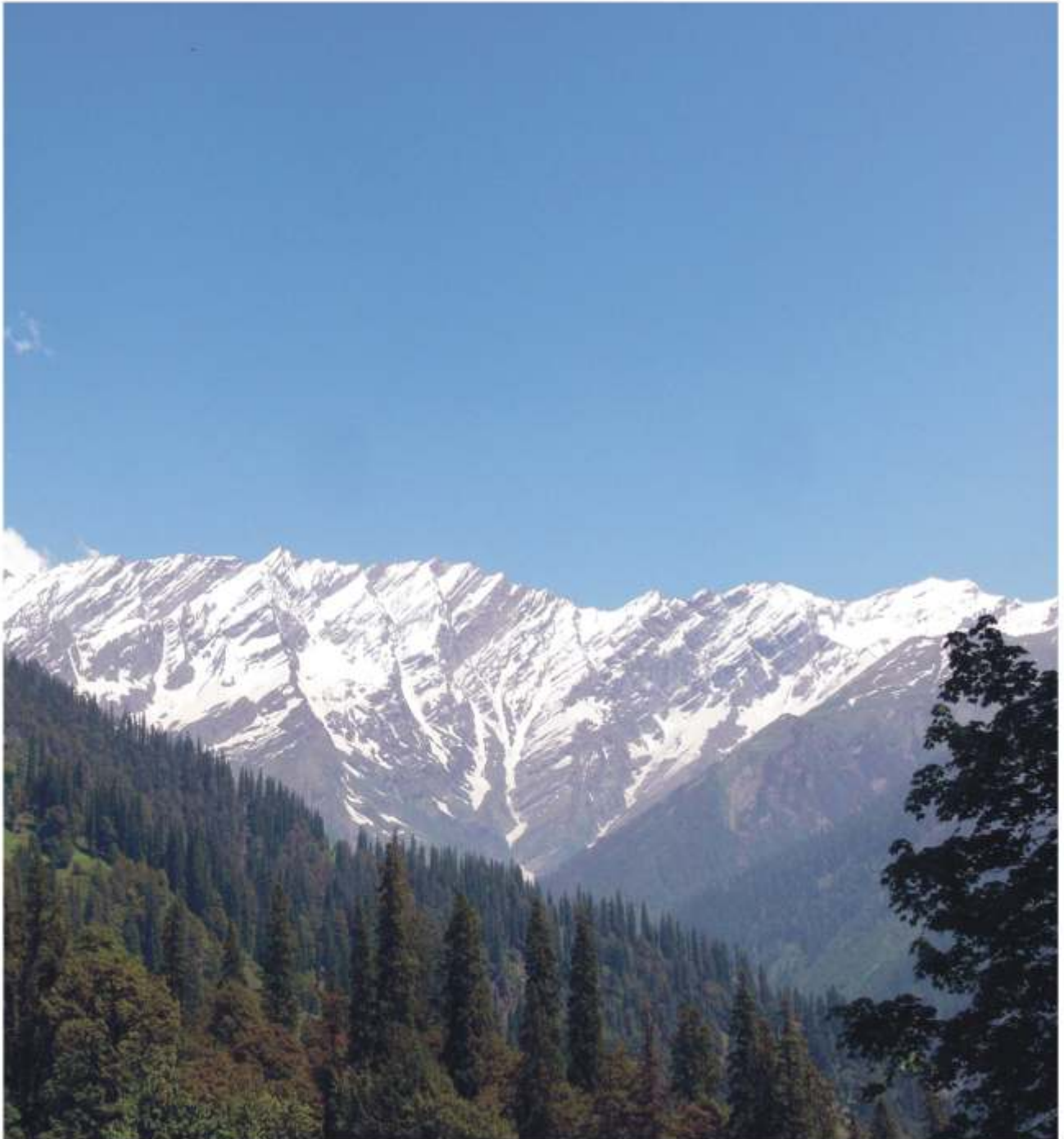
The implementation and management of various forestry programmes and projects connecting institutions and people at grassroots level brings efficacy in achieving national targets and international commitments. The phased approach of REDD+ brings nature-based solutions in the form of land based targets. With the diverse biophysical variables and forest types reflect the diversity of forest management activities and their challenges in India. This can be realized and analyzed via developing SRAPs and its implementation. Therefore, it automatically helps in addressing the larger objective at a global level, i.e., Sustainable Development Goals.

SRAP is an important instrument in REDD+ which brings optimistic results from the intervention packages resulted from SRAP as an effective and desired



outcome. Implementation of SRAP will be helpful in climate change mitigation and in achieving the targets of Sustainable Development Goals related to forests. It is an implementation process for incentivizing the communities to conserve, enhance and sustain the forests and simultaneously uplifting the economy as a whole and bringing a more resilient society for the

future. SRAP directly contributes to SDG Goal 15 (Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss), Goal 13 (Climate Action), Goal 3 (Good health and Well-being), Goal 5 (Gender Equality) and Goal 17 (Partnerships to achieve the Goal).





HIMACHAL PRADESH: A CONTEXTUAL BACKGROUND

The geographical area of Himachal Pradesh is 55,673 sq km constituting 1.69% of the geographical area of the country. It comes under three distinct regions and that is the Shivalik with altitude up to 1500 m, Middle Himalayan region between 1500-3000 m and the Greater Himalaya higher than 3000 m.

On 18th December 1970 the State of Himachal Pradesh Act was passed by the Parliament and the new state came into existence on 25th January 1971. The state has 12 districts, i.e., Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Lahaul & Spiti, Mandi, Shimla, Sirmaur, Solan and Una. As per Census of India 2011, the total population of Himachal Pradesh is 68,64,602 with overall population density of 123. The literacy rate of Himachal Pradesh is 82.80% and male literacy overrides with 13.6% over female literacy. For the period of 2017-18, overall food grain production of

16.45 Lakh metric tonnes and fruit production of 5 Lakh tonnes and the per capita income of the state of Rs.1,58,462 has been reported.

The state has a complex geological structure and varied climatic conditions along with rich temperate flora. The fragile ecology of the state is vulnerable to various natural disasters. The state is divided in five zones viz. (i) Wet sub-temperate zone, (ii) Humid sub-temperate zone, (iii) Dry temperate-alpine high lands, (iv) Humid sub-tropical zone, and (v) Sub-humid sub-tropical zone. The climate varies between hot and humid in the valley areas to freezing cold in the home of perpetual snow. Based on climate, the state is divided in three zones (i) Outer Himalaya, (ii) Inner Himalaya and (iii) Alpine Zone. Moreover, five perennial rivers Sutlej, Beas, Ravi, Chenab and Yamuna flow through its territory.



Status of Forests in Himachal Pradesh: The forest and tree cover in the state is 16262.52 sq km which is 29.21% the state's geographical area. According to forest canopy density classes, the state has 3112.71 sq km under very dense forest, 7125.93 sq km under moderately dense forest and 5194.88 sq km under open forest. There was net increase of 334 sq km in forest cover which is attributed to plantation and conservation activities both within and outside the recorded forest areas. The recorded forest area of the state is 37033 sq km which is 66.52% of its geographical area. The reserved, protected and unclassified forests constitute 5.13%, 89.46% and 5.41%, respectively of the recorded forest area. The

current growing stocks of recorded forest area and tree outside forest are 372.26 million cum. The total carbon stock of forests in the state is 252.36 million tonnes (925.32 million tonnes of CO₂ equivalent) which is 3.54% of total forest carbon stocks of the country (FSI, 2019).

Changes in Forest Cover: Based on the satellite data assessment by Forest Survey of India, area of very dense forest has decreased by 3.53% in 2017 but increased by 0.01% from 2017 to 2019 whereas increment of moderately dense forest was recorded by 0.76% in 2019. Changes in the forest cover of Himachal Pradesh are given in Table 1 and Figure 1.

Table 1: Forest Cover in Himachal Pradesh from 2005-2019

Year	Very Dense Forest (sq km)	Moderately Dense Forest (sq km)	Open Forest (sq km)	Scrub (sq km)	Tree cover (sq km)	Total area (sq km)
2005	1097	7831	5441	383	709	15461
2009	3224	6383	5061	327	638	15633
2011	3224	6381	5074	328	623	15630
2013	3224	6381	5078	298	697	15678
2015	3224	6381	5091	301	757	15754
2017	3110	6705	5285	308	822	16230
2019	3112.71	7125.93	5194.88	315.28	829	16577.8

(Source: FSI, 2005; 2009; 2011; 2013; 2015; 2017 and 2019)

Himalayan Moist Temperate Forests (44.21%) covers the maximum area (Table 2) followed by Subtropical Pine Forests (22.35%) and least by Moist Alpine Scrub (0.65%). Moreover, insignificant changes were found from 2008-09 to 2015-16 in the wasteland area which is contributing 41.01% of total geographical area of the state.

In Himachal Pradesh, the population living in the forest fringe villages is about 7,81,340. On an average, the people living near forest fringes collected fuelwood,

fodder, small timber and bamboo annually at the rate of 0.59 million tonnes, 3.25 million tonnes, 0.011 million cum and 593 tonnes, respectively. The bamboo bearing area has decreased by 110 sq km in 2019 in comparison to 2017. Major invasive species of Himachal Pradesh are *Lantana camara*, *Parthenium hysterophorus*, *Ageratum conyzoides* and *Eupatorium adenophorum* which are threat to the forest biodiversity.

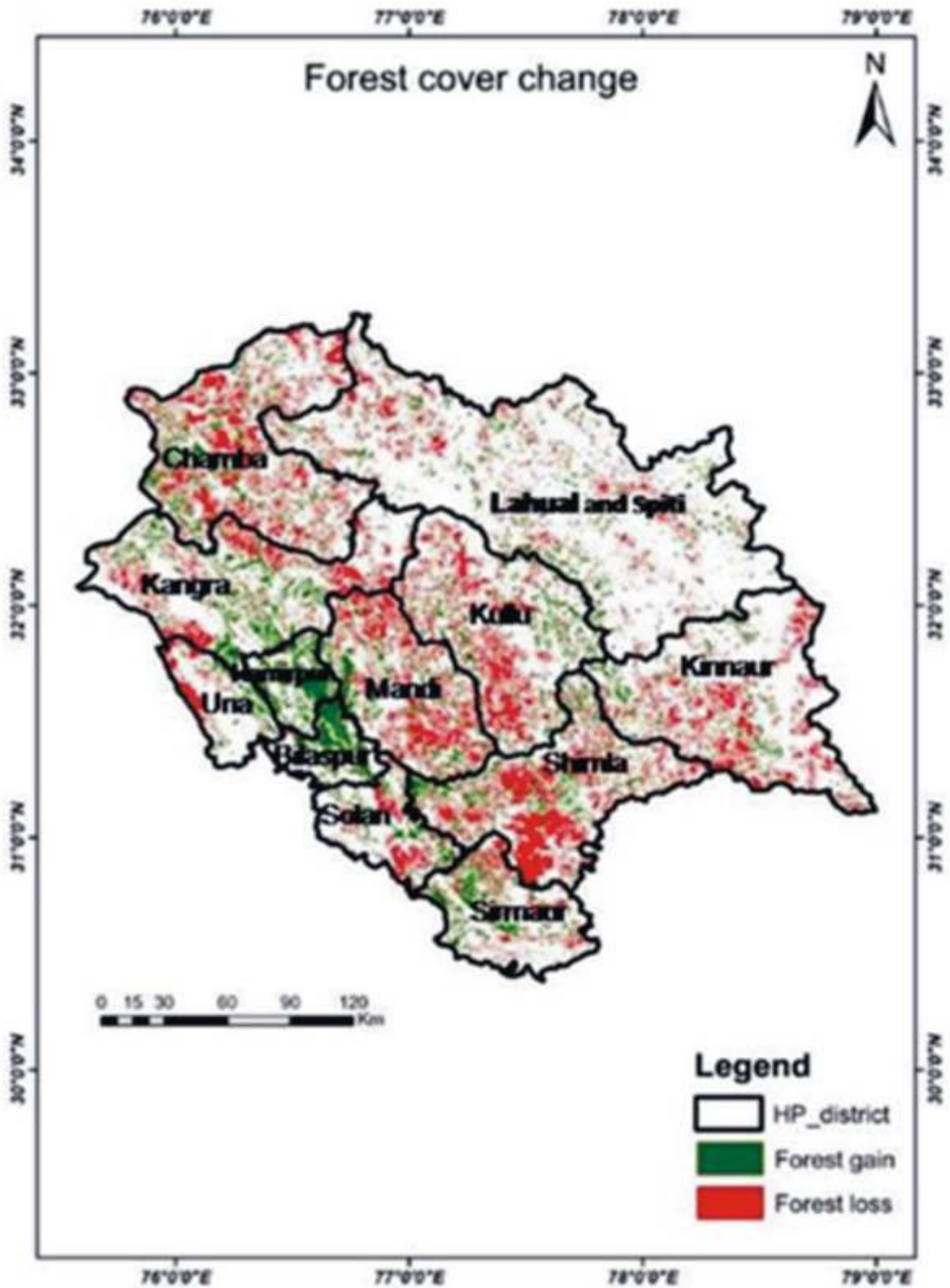


Figure 1. Forest cover change map of Himachal Pradesh.



Table 2: Area under different Forest Types Groups and Canopy Density Classes of Himachal Pradesh

S.No .	Forest Type Group	Area (sq km)				
		Very Dense Forest	Mod. Dense Forest	Open Forest	Scrub	Total
1.	Group - 3 Tropical Moist Deciduous Forests	37.93	233.19	131.0	0.46	402.58
2.	Group - 5 Tropical Dry Deciduous forest	42.84	488.36	780.0	71.51	1382.71
3.	Group - 9 Subtropical Pine Forest	122.44	1701.78	1376.57	96.07	3296.86
4.	Group - 12 Himalayan Moist Temperate Forest	679.92	4051.05	1733.0	57.15	6521.12
5.	Group - 13 Himalayan Dry Temperate Forest	45.82	465.81	418.30	26.14	956.07
6.	Group - 14 Sub Alpine Forest	120.92	424.63	290.40	14.29	850.24
7.	Group - 15 Moist Alpine Scrub	2.85	45.59	39.20	8.21	95.85
8.	Group - 16 Dry Alpine Scrub	44.14	211.64	321.73	109.0	686.51
	Total	1096.86	7622.05	5090.2	382.83	14191.94

(Source: FSI, 2011)





METHODOLOGY AND PROCESS

3.1

SRAP Summary

The methodology and process adopted for preparation of Himachal Pradesh State REDD+ Action Plan were based on the manual "Developing Sub-national REDD+ Action Plans: A Manual for Facilitators" (Richards *et al.* 2017). This manual is based on the experiences of developing five Sub-national REDD+ Action Plans in Vietnam, two Sub-

national REDD+ Action Plans in Nepal under the umbrella of the UN-REDD Programme of these countries and State REDD+ Action Plans for Mizoram and Uttarakhand under REDD+ Himalaya Project. There are five main steps in the development of SRAPs as indicated in Table 3.

3.2

Workshop for preparation of Himachal Pradesh State REDD+ Action Plan

Himalayan Forest Research Institute (HFRI), Indian Council of Forestry Research and Education (ICFRE), International Centre for Integrated Mountain Development (ICIMOD) and Himachal Pradesh Forest Department jointly organised two days multi-stakeholder consultation workshop and one day expert consultation meeting at HFRI, Shimla for preparation of State REDD+ Action Plan (SRAP) for the state of Himachal Pradesh. The workshop was

attended by the participants from Himachal Pradesh State Forest Department and other line departments of Himachal Pradesh State Government, Science and Technology institutions, NGOs and local community members on 18-19th June 2019. The expert consultation meeting was held on 21st June 2019. Lists of participants are given in Annex 1 and 2. The relevant stakeholder for the SRAP preparation of Himachal Pradesh is given in Annex 3.

Table 3: The main steps and activities in the SRAP process

Important steps	Process/Activities
Stages A: Prepare Identification of core planning team and preparation of initial consultation and inception workshop	Identification and selection of multi-stakeholder workshop participants Preparatory analysis of including spatial analysis including the capacity building of the selected participants
Stages B: Analyse Preparatory contextual analysis reviewed and endorsed by stakeholders	Spatial analysis through participation of various stakeholders for deforestation and forest degradation (D&FD) drivers and barriers to forest enhancement activities (problem trees) Identification and prioritization of the D&FD hotspots
Stages C: Plan Identification of intervention packages (IPs), risk and benefit analysis of IPs	Mapping of potential intervention packages (IPs), analyse social and environmental risks in implementation of IPs which are in compliance with the REDD+ safeguards along with the feasibility analysis
Stages D: Monitor Identification of proxy indicators and development of monitoring protocol	Development of monitoring plans for the IPs and proxy indicators Identification of risk reduction and equity enhancement measures and its negative impacts
Stages E: Budget and approval SRAP approval from REDD+ working group	Detailed activity planning and budgeting of every intervention packages in five-year operation plan SRAP document for approval

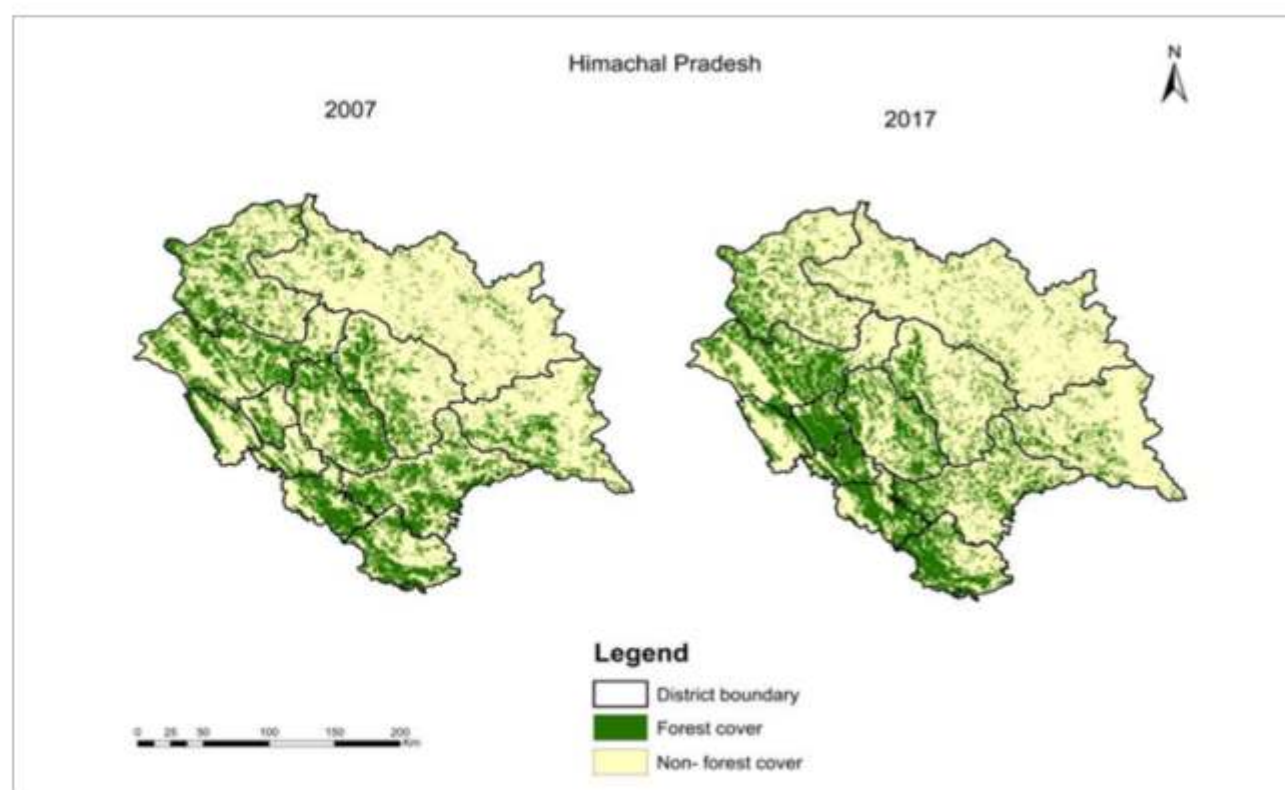


Figure 2. Changes in Forest Cover of Himachal Pradesh from 2007 to 2017



4

DIAGNOSTIC ANALYSIS AND PLANNING

4.1

Prioritization of Drivers of Deforestation and Forest Degradation, and Barriers for Carbon Enhancement Activities

In the workshop, participants were divided into three Working Groups (WGs) in order to analyse and prioritize the main drivers of deforestation and forest degradation (D&FD), as well as the main barriers to scale up forest carbon enhancement activities in the state. The prioritization of the drivers and barriers is the basis of the SRAP which help in determining key challenges in implementation of REDD+ activities. Spatial analysis is one of the key mediums for well informed participants to decide the effective prioritization process of the drivers of D&FD and barriers to forest carbon enhancement.

A key distinction in this stage is the difference between 'direct drivers' and 'underlying causes'. By definition

'direct drivers' are the specific land use activities (e.g., commercial logging, horticulture plantations etc.) that replace or degrade the natural forest, whereas the 'underlying causes' are the indirect or underlying factors (e.g., weak forest governance etc.) that lead to the direct drivers. The workshop participants were then divided into three working groups (WGs) based on their expertise and interest, as well as maintaining a reasonable institutional distribution among the three groups as under:

WG A: Deforestation drivers and underlying causes

WG B: Forest degradation drivers and underlying causes

WG C: Barriers to forest carbon enhancement



The process involved firstly a prioritization (e.g., of deforestation drivers) within each WG, secondly a plenary presentation of the higher priorities by each WG, and thirdly an overall scoring by all workshop participants of all the prioritized (by the three WGs)

D&FD drivers and barriers to enhancement. Table 4 presents the results of the priority drivers and barriers (to enhancement) identified for Himachal Pradesh. The ranking of drivers of D&FD and barriers to carbon enhancement is given in Annex 4.

Table 4: Prioritized drivers of D&FD and barriers to enhancement in Himachal Pradesh (identified in consultation workshop)

Drivers/ Barriers	Deforestation	Forest Degradation	Barriers to forest carbon enhancement	
Direct drivers	Expansion of roads	Infrastructure development (road constructions, hydropower projects)	Lack of suitable model for rehabilitation of degraded areas	
	Mining activities	Forest fires	Encroachment by agriculture and horticulture	
	Urbanization	Industrialization and mining	Invasive species	
	Hydropower projects	Illicit felling	Forest fires	
		Encroachment	Migratory grazing pressure	
		Extraction of wood for fuel and excessive lopping		
		Excessive grazing		
		Weed infestation		
		Deforestation	Forest Degradation	Barriers to forest carbon enhancement
	Underlying or indirect causes	Expansion of tourism activities (camps, hotels, etc.)	Climatic variability	Fragmentation of land
Transmission lines		Tree diseases and insect/pest attack	Shortage of field staff	
Noxious weeds species		Unscientific extraction of NTFPs and timber	Construction of highways	
Intensive agriculture		Over exploitation due to demographic pressure	Illicit felling	
Over dependency on agricultural and horticultural land		Non-implementation of working plans (WPs) and silvicultural prescriptions	Lack of public awareness and motivation	
Construction of dams		Pollution	No incentives	
Conversion of forest land for settlements		Tourism	Seasonal variations (climate change)	
		Landslides	Out migration	
			Seasonal employment	
			Tough terrain	
		Lack of extension agents and activities		
		Unscientific plantations (silvicultural practices)		
		Lack of timely funds		
		Poor benefit sharing		
		Increase of land values		



The workshop participants identified and prioritized the following direct drivers of D&FD and barriers to enhancement through participant scoring system (Figure 3):

- Direct drivers of deforestation: Urbanisation/diversion of forested land for development activities
- Direct drivers or causes for forest degradation: Weed infestation and forest fires
- Barriers to enhancement: Lack of suitable model for rehabilitation of degraded areas

Based on multi-stakeholder’s consultation, working groups had identified areas potentially having severity of deforestation or forest degradation due to direct and indirect drivers. Moreover, barriers to expansion of carbon enhancement activities were also realised in several areas or hotspots of the state which has

proposed to enhance the carbon sequestration capability.

The prioritised D&FD drivers and barriers to enhancement are a necessity for a focussed SRAP and these drivers behave as key challenges and form the basis to analyse the problem trees and hence the solution trees in order to identify and map the potential Intervention Packages (IPs) with intensive analysis. The problem trees of D&FD and barriers of carbon enhancement are given in Annex 5. The working groups further discuss the priority drivers or enhancement activities. The solution tree was based on the key challenges reflected by the problem trees. The cause and effect relationship form the basis of Himachal Pradesh State REDD+ Action Plan (SRAP). The hotspots of Himachal Pradesh are given Figure 5.

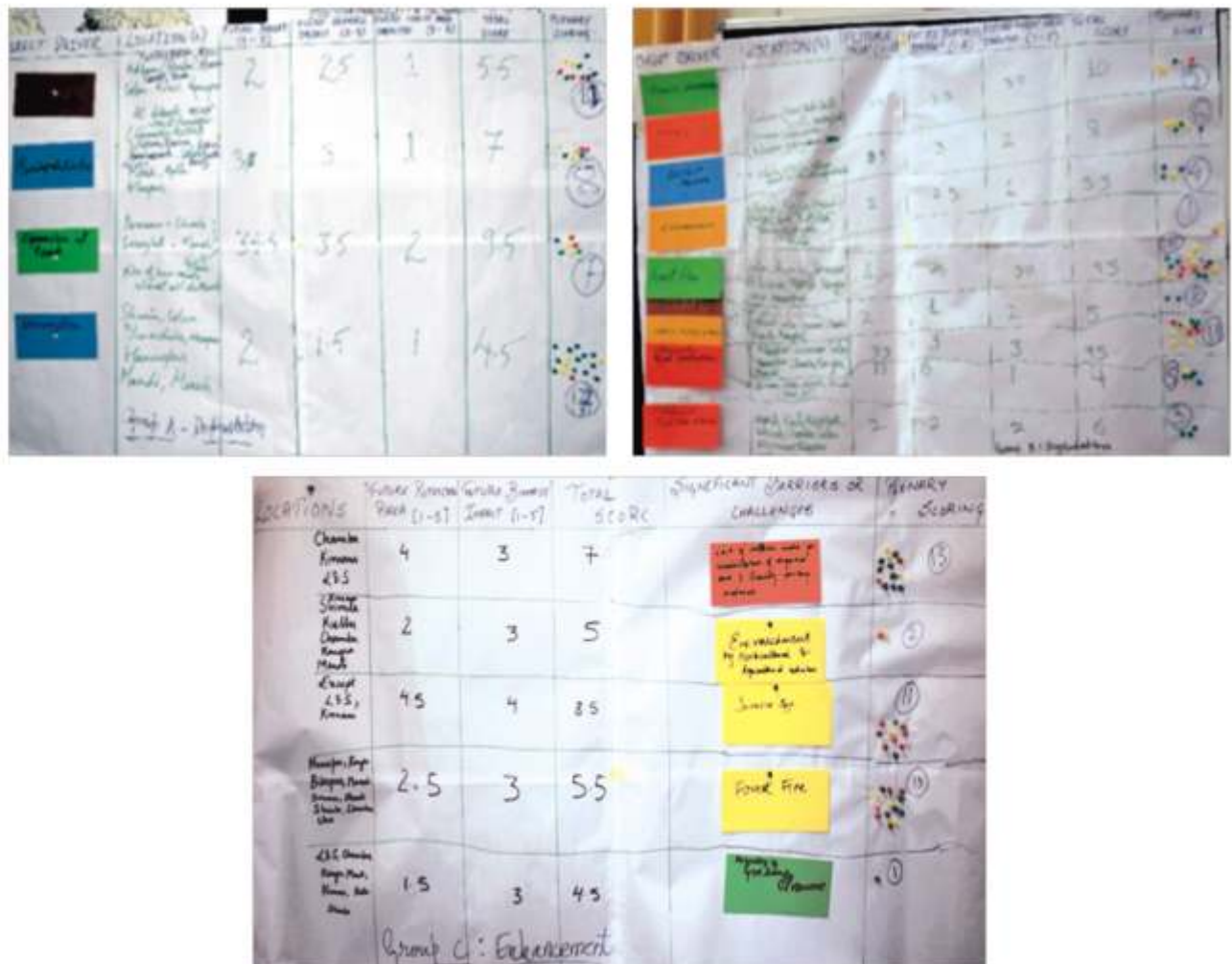


Figure 3. Plenary Scoring sheets to prioritize the drivers of deforestation and forest degradation and barriers to carbon enhancement

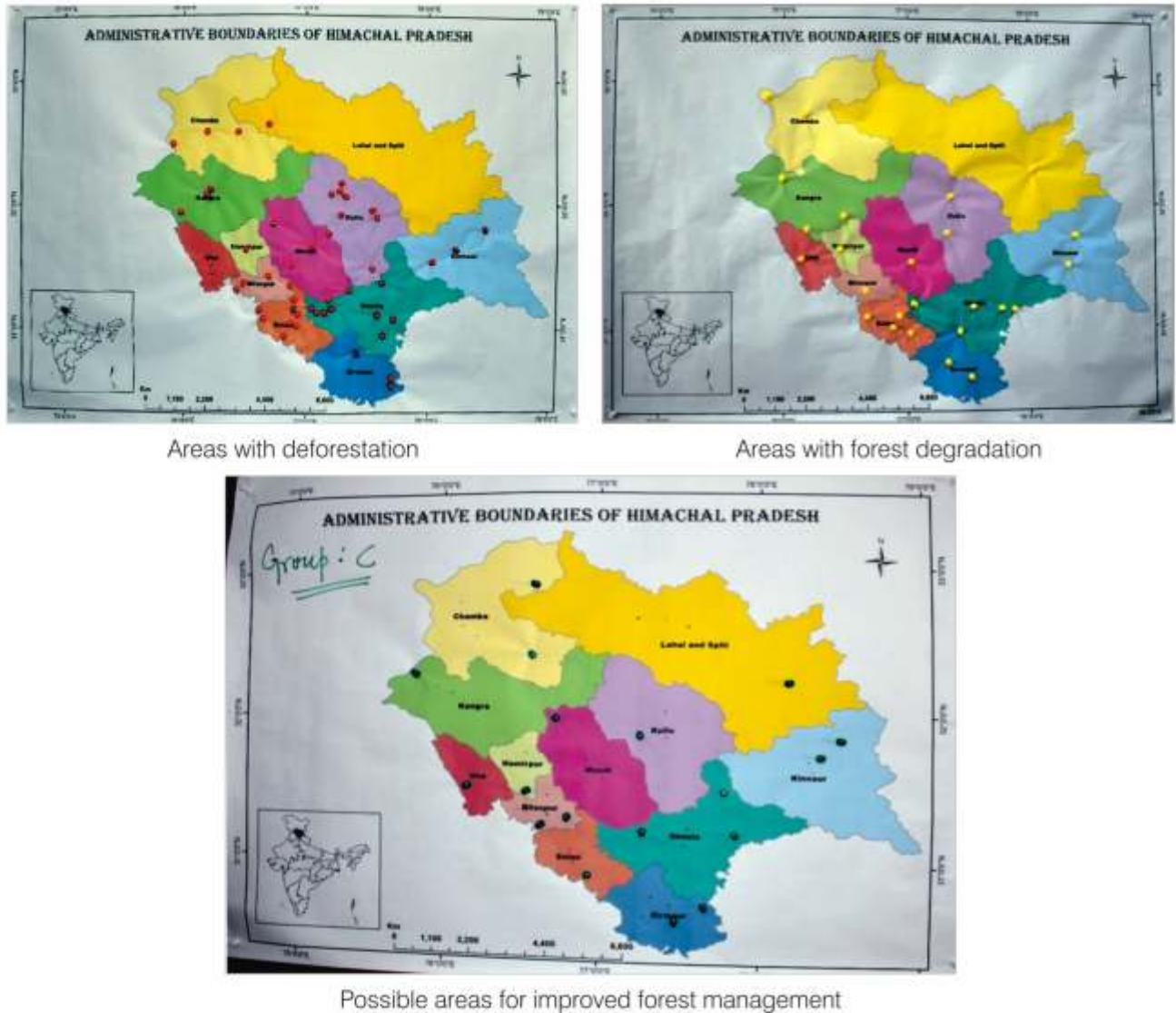


Figure 4. Identified areas with deforestation, forest degradation and enhancement activities in Himachal Pradesh

4.2

Problem Trees and Solution Trees: Important for Theory of Change Analysis

The problem and solution trees developed reflect cause and effect relationship to map and identify potentially appropriate Intervention Packages (IPs). Based on preliminary and in-depth spatial analysis of areas and hotspots, conceptual models are developed for the drivers of D&FD and barriers to carbon enhancement.

The models behave as a basis of the SRAP process which follows theory of change approach and helps in

bringing intended objectives/outputs with the development of impactful IPs. Figure 3 shows the three working groups exercises and identifies the direct and indirect causes as a key challenge in the form of problem tree.

The reverse of the problem tree is solution tree or result chain which responds to problem trees. This behaves as a foundation of SRAP as the analysis at this stage brings effective formation of IPs. Figure 6 has shown step by step process of SRAP.



In Himachal Pradesh, four relevant outcomes of solution trees were derived from four sets of problem trees developed to address drivers of D&FD and barriers to forest carbon enhancement. They are as follows:

1. **Diversion of forest land managed:** The prioritised driver finalised was diversion of forested land for developmental activities, the desired outcome in the solution tree was formulated as 'Diversion of forest land managed'. There are four key results identified for achieving the desired outcomes: lack of vision, political will considering land use planning, road and hydroelectric projects, construction of schools, hospitals, colonies, housings, tourism infrastructures, mining and industrializations.
2. **Weed infestation reduced:** Out of the two drivers of forest degradation, the first driver was weed infestation and it resulted into 'weed infestation reduced' as a solution. The key results are effective implementation of working plan prescription, developed state level policy/strategy for management of invasive alien plant

species, implemented state action plan on climate change and revised state action plan on biodiversity.

3. **Forest fire frequency and incidents minimised:** The second driver for forest degradation is high incidence and frequency of forest fires. The solution for this direct cause is 'forest fire frequency and incidents minimized'. The identified key results are silvicultural prescriptions on forest fire control implemented, forest fire hazard warning system developed and adequate funds for forest fire control made available.
4. **Adequate measures developed for rehabilitation of degraded forest lands and other lands:** The driver finalised was lack of suitable intervention for rehabilitation for degraded and other lands for the barrier for carbon enhancement. The solution tree identified was 'adequate measures developed for rehabilitation of degraded forest lands and other lands.' The key results are quality planting material identified and used, site specific projects/sub projects developed, and incentive instrument developed.



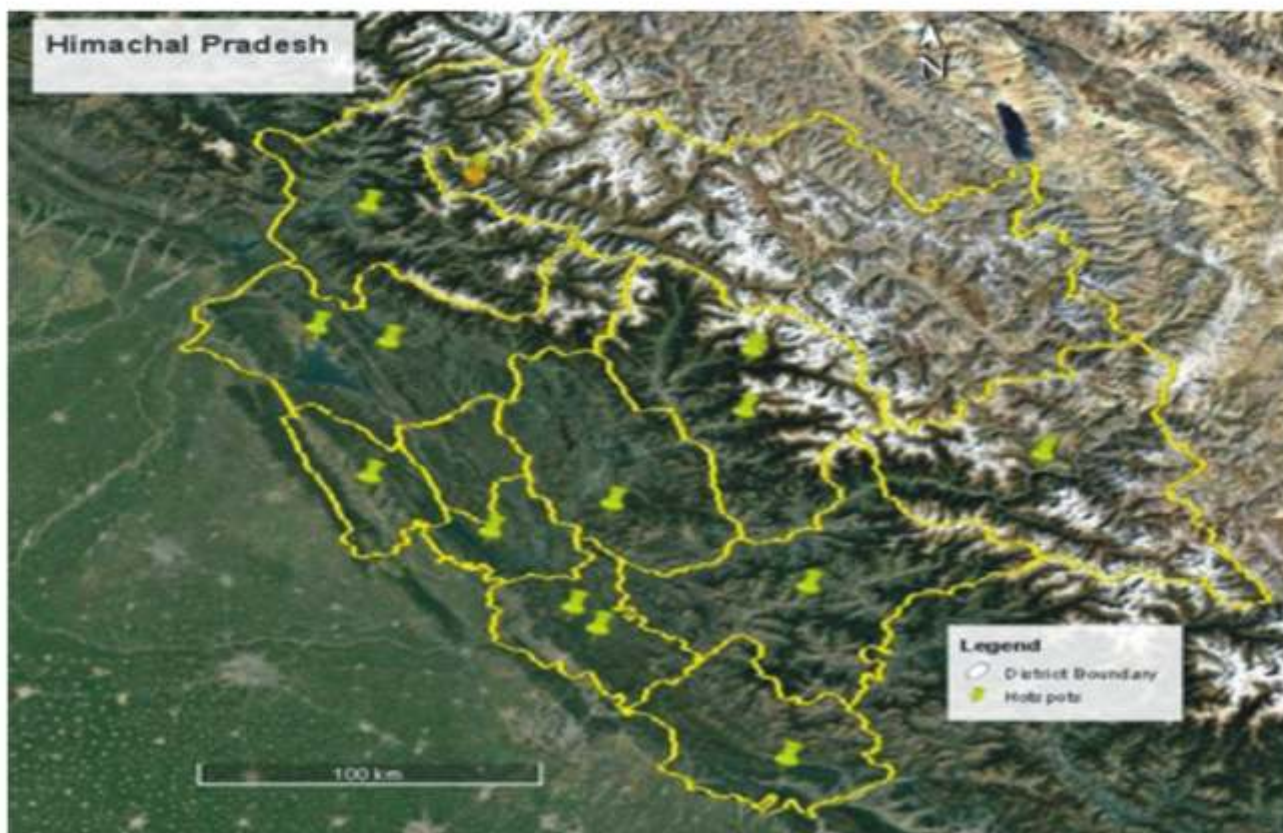


Figure 5. Map of Hotspots in Himachal Pradesh

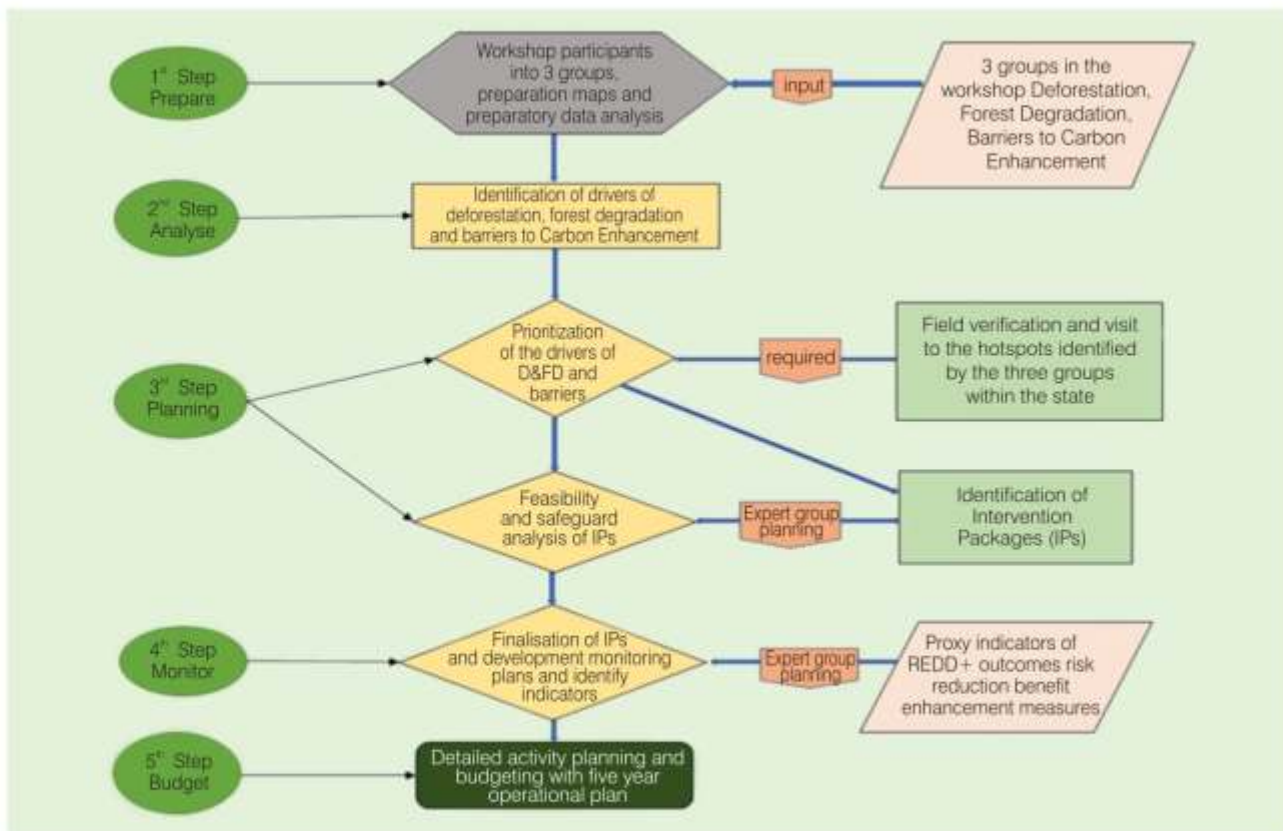


Figure 6. Step by step process of State REDD+ Action Plan

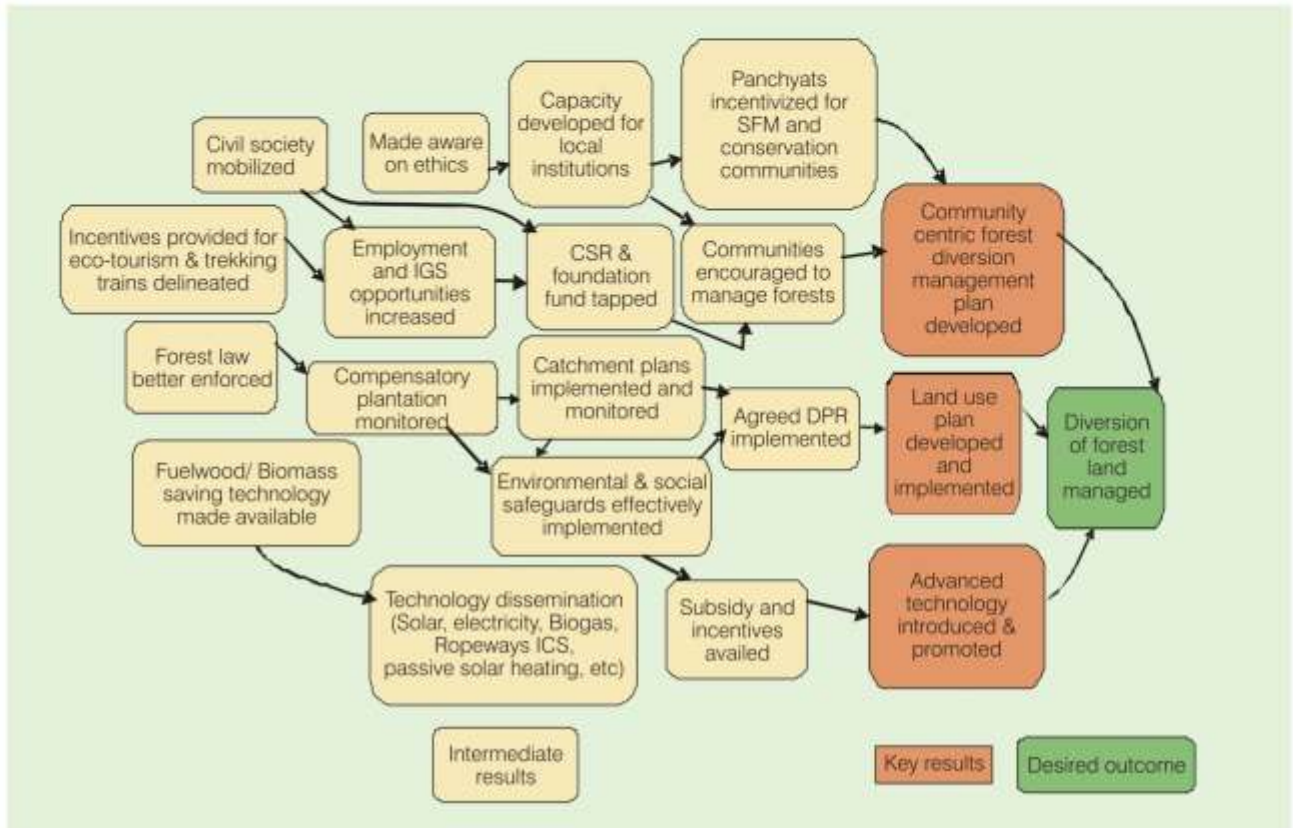


Figure 7. Solution tree for deforestation: Diversion of forest land managed

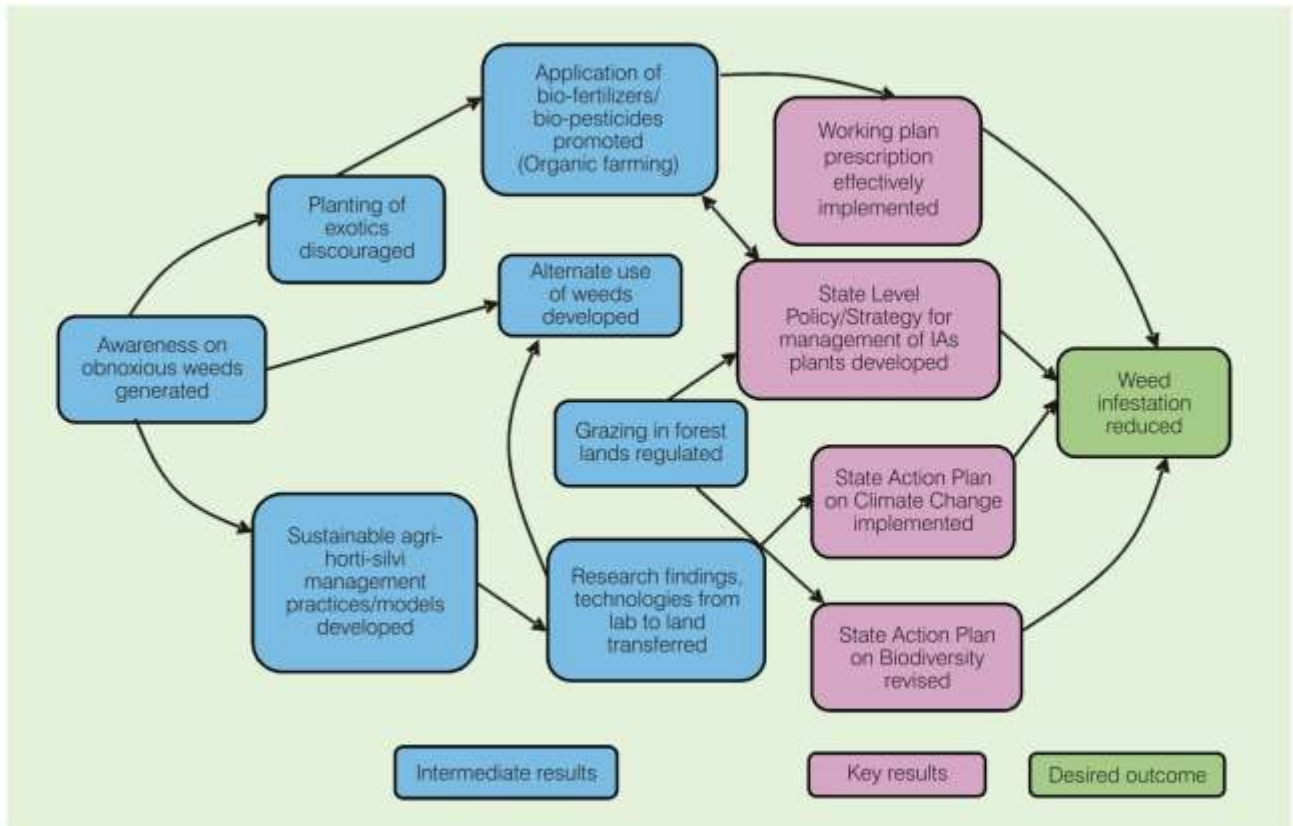


Figure 8. Solution tree for forest degradation: Weed infestation reduced

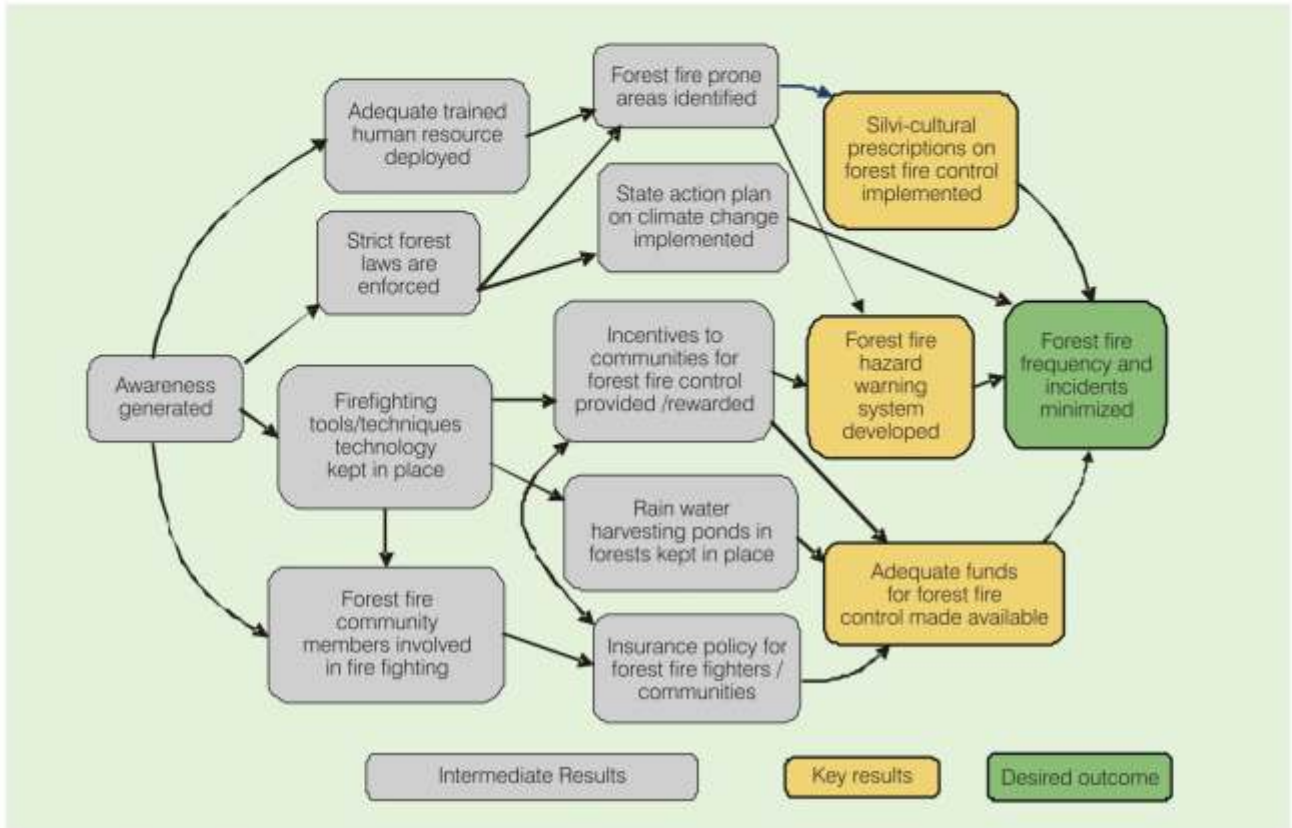


Figure 9. Solution tree for forest degradation: Forest fire frequency and incident minimized

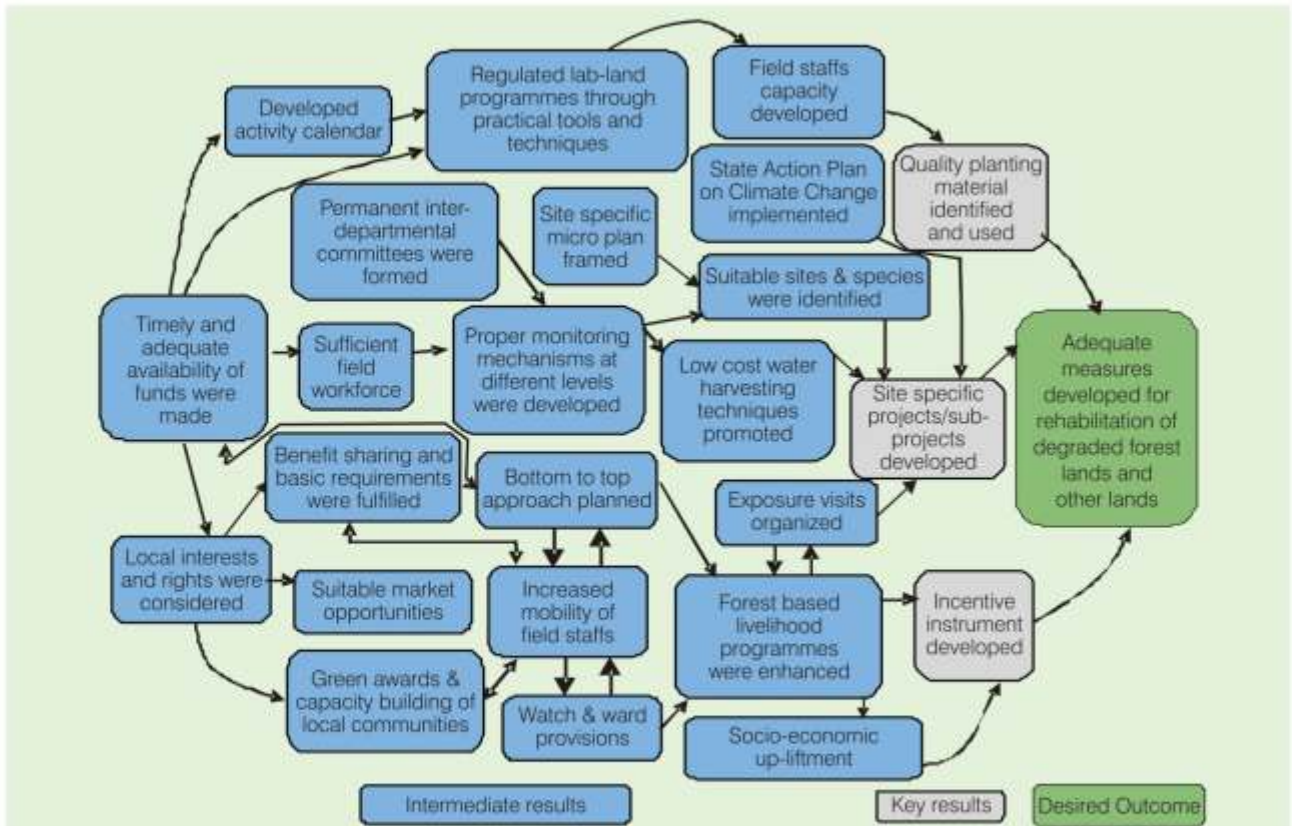


Figure 10. Solution tree for forest carbon enhancement: Adequate measure developed for rehabilitation on degraded forest lands and other lands



4.3

Development of Intervention Packages

The intervention packages (IPs) were formulated taking the reference of solution trees and problem trees. The identified desired outcomes from the solution trees were used to formulate strategies and IPs in close consultation with the experts and the core team members. Once the IPs were designed,

strategies and expected outputs were also formulated which were crucial to design the specific activities and also for their feasibilities. All the IPs indicated the drivers & barriers to be addressed. The designed IPs along with set of strategies and outputs for Himachal Pradesh are given in Table 5.

Table 5: Intervention Packages with respective results and outputs

Name of drivers that are addressed	Intervention Packages	Strategies	Outputs
Deforestation	Improved management of forest land diversion	Participation of local communities in preparation and implementation of environment management plan/forest diversion management plan	Community centric environment management plan/forest land diversion plan developed
		Development and implementation of State Land Use Plan	Afforestation and rehabilitation sites identified Improved monitoring through preparation of maps and spatial analysis
Forest degradation	Minimization of frequency and incidence of forest fire	Silvicultural prescriptions/operations on forest fire implemented	Compliance to Forest Working Plans at local level
		Increased investment for forest fire preventive and treatment measures	Enhanced capability to deal with threat of forest fire
	Management of invasive plant species	Forest Working Plans prescriptions effectively implemented	Weed control programme implemented in forested areas and degraded lands
		State level policies/strategies/plans for management of invasive species developed	Invasive plant species controlled Improved coordination for managing invasive plant species Improved transfer of technology
Barriers to forest carbon enhancement	Adequate measures developed for rehabilitation of degraded forest lands and other lands	Site specific projects developed	Forest and tree cover in degraded forest land including trees outside forest increased
		Incentive instrument developed	Appropriate Forest resource saving technology introduced and promoted
		Improved technology for rehabilitation	Quality planting material made available and used Scientific practices/techniques used for plantation/rehabilitation management



4.4

Identification of Strategies and Activities of IPs

One of the most important characteristics is that each provisional IP should contain strategy or incentive measures to tackle the problems arising from the drivers of D&FD and barriers to forest carbon

enhancement. Apart from this, IPs should contribute to the implementation of national policies and plans. Table 6 has presented key results, outputs and activities of IPs.

Table 6: Key results, outputs and activities of IPs for Himachal Pradesh

Key results or strategies	Outputs	Activities
Participation of local communities in preparation and implementation of environment management plan/forest diversion management plan	<ul style="list-style-type: none"> Community centric environment plan/forest land diversion plan developed 	<ul style="list-style-type: none"> Stakeholders develop plans for environment management plan/forest diversion management plan Communities undertake compensatory afforestation/rehabilitation activities Capacity development of local community institutions
Development and implementation of State Land Use Plan	<ul style="list-style-type: none"> Afforestation and rehabilitation sites identified Improved monitoring through preparation of maps and spatial analysis 	<ul style="list-style-type: none"> Remote Sensing based maps developed Demarcation of forested, deforested, degraded, and built up areas Monitoring and implementation of DPR, Catchment Plans, Compensatory Afforestation and monitoring
Silvicultural prescriptions/operations on forest fire implemented	<ul style="list-style-type: none"> Compliance to Forest Working Plans at local level 	<ul style="list-style-type: none"> Timely revision of Forest Working Plans Timely execution of silvicultural prescriptions Capacity building of SFD and local communities for revision and implementation of Forest Working Plans
Increased investment for forest fire preventive and treatment measures	<ul style="list-style-type: none"> Enhanced capability to deal with threat of forest fire 	<ul style="list-style-type: none"> Early fire warning system Fire hazard mapping of vulnerable areas Procurement of firefighting tools Build capacity of forestry staff (SFD) and local community for fire management Raise awareness of local communities Mobilize local communities for fire fighting and preventive measure Promote alternative use of forest litter (pine needle and invasive species)



		<ul style="list-style-type: none"> • Promotion of rain water harvesting structure/techniques • Insurance schemes and awards for motivating forestry staff and local communities for forest fire fighting
Forest Working Plans prescriptions effectively implemented	<ul style="list-style-type: none"> • Weed control programme implemented in forested areas and degraded lands 	<ul style="list-style-type: none"> • Capacity development for weed management • Weed control measures implemented by communities and SFD (removal, utilization, grazing, etc)
State level policies/strategies/plans for management of invasive species developed	<ul style="list-style-type: none"> • Control of invasive plant species • Improved coordination for managing invasive plant species • Improved transfer of technology 	<ul style="list-style-type: none"> • Weed control mainstreamed in State Action Plan on Biodiversity and State Action Plan on Climate Change • Implemented weed control activities in the State through various strategies/plans. • Annual inter-departmental coordination meeting to review progress on invasive species management • Extension services expanded with appropriate available practices/techniques
Site specific projects developed	<ul style="list-style-type: none"> • Forest and tree cover in degraded forest land including trees outside forest increased 	<ul style="list-style-type: none"> • Stakeholder consultations for identifying and designing specific projects • Plans for restoration of degraded forest lands and other lands developed and implemented • Agroforestry models developed and promoted • Exposure field visits • Capacity development of SFD
Incentive instrument developed	<ul style="list-style-type: none"> • Appropriate forest resource saving technology introduced and promoted 	<ul style="list-style-type: none"> • IGA and employment opportunities for forest dependent communities • Alternative Energy technology disseminated (solar, biogas, ICs, passive heating) • Improved fodder management through silage technology
Improved technology for rehabilitation	<ul style="list-style-type: none"> • Quality planting material made available and used • Scientific practices/techniques used for plantation/rehabilitation management 	<ul style="list-style-type: none"> • Modern nurseries established • Quality planting material raised and transplanted • QA/QC undertaken • Using drone technology for mapping and monitoring the status of rehabilitation



4.5

Feasibility Analysis of Intervention Packages

After the identification of IPs, feasibility assessment for each IPs were carried out, based on the risks, cost (implementation & opportunity) and incentives measures. It helps in identifying more practical and cost-effective IPs. Though cost effectiveness is an important criterion for IPs feasibility but at the same time it should be assumed that the costs and resources required for implementation will be covered by REDD+ finance, if SRAP becomes operational. Table 7 shows the overall feasibility of the IPs based on

the above mentioned criteria. The scoring system has shown that the most feasible IP is adequate measures developed for rehabilitation of degraded forest lands and other lands. The higher the scores in the analysis, the higher the feasibility of IP. The minimum feasibility of IP was shown by minimization of frequency and incidence of forest fire. Overall, this ranking shows that the designed IPs are feasible which can be taken forward for the implementation.

Table 7: Overall feasibility analysis of intervention packages

Intervention packages	Implementation risks/obstacles (L=3, M=2, H=1)	Cost-effectiveness of risk reduction measures (L=1, M=2, H=3)	Implementation cost (L=3, M=2, H=1)	Opportunity cost (L=3, M=2, H=1)	Incentive measures (L=1, M=2, H=3)	Total Score
Improved management of forest land diversion	1	2	1	3	2	09
Minimization of frequency and incidence of forest fire	2	2	1	2	1	08
Management of invasive plant species	2	3	1	2	2	10
Adequate measures developed for rehabilitation of degraded forest lands and other lands	2	3	2	1	3	11



4.6

Safeguard Analysis of Intervention Packages

The significance of the safeguard analysis is to analyse the proposed IPs against the 'Cancun Safeguards' of UNFCCC. Identification of risks or threats to the safeguards is the primary aim and secondary aim is to identify the contribution of an IP for strong and effective governance along with social and environmental benefits. This requires a meticulous explanation for the proposed IPs which should explain the vulnerability group as a social risk and negative impact on biodiversity and ecosystem services as environmental risk.

The safeguard analysis of the identified IPs was conducted in the expert consultation workshop, where

the participants identified the implementation risks and obstacles. This was done on the basis of High, Medium and Low ranking for likelihood and impact of risk. For minimizing the risk, risk reduction measures were also identified. In similar manner, participants worked on social and governance issues and environmental safeguards, where benefits and benefits enhancement measures were also identified. Finally, to improve the analysis, all the identified risks and benefits were revisited by the groups and modified if needed.

Risks and threats identified for each IP are shown in Table 8 & 9. This also includes risk reduction measures and benefit enhancement measures.

Table 8: Implementation risks and obstacles analysis of Intervention Packages

Intervention Packages	Implementation risk or obstacles	Likelihood of risk (H/M/L)	Impact of risk (H/M/L)	Risk Reduction Measures
Improved management of forest land diversion	Low incentives and skilled human resources for implementation, long government procedures	M	M	High incentives, simplification of government procedures, new recruits of skilled workers
Minimization of frequency and incidence of forest fire	Lack of awareness and manpower, anthropogenic fire for developing grasslands	M	H	Awareness campaigns, mobilisation of forestry staff, establishment of reward mechanism
Management of invasive plant species	Forest working plans are not timely updated and hence data deficit, lack of transfer of technology	H	H	Awareness on weeds affecting the productivity of land, promotion of the successful agroforestry models, timely update of forest working plan
Adequate measures developed for rehabilitation of degraded forest lands and other lands	Lack of appropriate technology for the quality planting material, lack of public awareness, low incentives	H	H	Awareness, high incentives, promotion of quality planting material and other conservation measures



Table 9: Analysis of social and environmental benefits of Intervention Packages

Intervention Packages	Social/environmental benefits	Likelihood of benefit (H/M/L)	Impact of benefit (H/M/L)	Benefit Enhancement Measures
Improved management of forest land diversion	High economic return, better forest cover and well-planned land use	M	M	Well planned land use activities such as rehabilitation degraded sites
Minimization of frequency and incidence of forest fire	Uncontrolled fires managed forest fires mitigated	M	H	Awareness campaigns along with new technologies to mitigate the forest fire especially the vulnerable areas
Management of invasive plant species	High productive forest increment of forest cover, more skilled forest staff	M	H	Synchronisation with biodiversity action plan of state, market of multiple use of alienated species,
Adequate measures developed for rehabilitation of degraded forest lands and other lands	Increased income generation local species replaced with exotic species	H	H	Stand of healthy native species, developed package of practices of native species, training of demonstration sites

4.7

Gap Analysis

In the multi-stakeholder's workshop, gap analysis was done through involving stakeholders from Forest Department, Horticultural Department, other government departments, State Universities, Research Institutions, Panchayats and NGOs, etc. currently implementing various activities and measures for addressing the drivers of D&FD. Following challenges in the form of gaps have been observed for successful implementation of SRAP activities in Himachal Pradesh:

- Difficulty in the estimation of the emission reduction and removal at state level resulting from the implementation of SRAP.
- Due to shortage of field staff and capacity at all levels, lack of comprehensive understanding of the REDD+ compliance process.
- More representatives of female working group during the implementation of SRAP activities is required in order to assess the potential gender risk and benefit especially during the process of IP's execution.
- The undulating terrain condition is predominant and poses challenges for the successful implementation.



4.8

Monitoring

The reliability of the implementation of REDD+ activities is in monitoring at all levels. For successful implementation of SRAP, assessment of the impacts of IPs is vital and needs monitoring of the proxy indicators especially the data generated from grassroots level. Therefore, the indicators should be measurable and it is essential for adaptive management of SRAP.

The success of SRAP also depends upon the participation of local stakeholders and impact of IPs on their livelihoods. The indicators should also be derived from social and environmental benefit enhancement measures and risk reduction measures and other

safeguard related indicators are also necessary for effective implementation of SRAP. It is a challenging task both technically and institutionally. Therefore, effective monitoring will help in achieving the desired outcome of SRAP. This requires different forms of trainings and capacity building programmes from grassroots level to its highest level especially the synchronisation of the forest department and local people. This is necessary for cost effective and accurate methodology for data collection and validation.







BUDGET AND OPERATIONAL PLAN

The outputs and targets of IPs should be quantified as it is needed for SRAP budget. Detailed and transparent budgeting of the SRAP is required to draw up a five-year Operational Plan. It is presented in Table 10. This needs to be presented to the potential national or international donors for funding. The quantitative implementation targets which is defined in the planning stage (and also required for the monitoring stage) are the starting point for the budgeting process, followed by a detailed breakdown

of activities needed to achieve each output, tasks and resources needed. This stage also undertakes gap analysis between the IPs identified in the SRAP and activities already planned and budgeted since the SRAP budget clearly identifies the additional resources requirements. The detailed IPs along with monitoring plan and budget are given in Annex 6.

Table 10: Estimated Budget (Rs. in lakh) for the five-year Operational Plan.

Intervention Packages	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Improved management of forest land diversion	400	600	500	450	330	2280
Minimization of frequency and incidence of forest fire	500	750	650	400	300	2600
Management of invasive plant species	350	600	450	300	250	1950
Adequate measures developed for rehabilitation of degraded forest lands and other lands	700	900	800	630	340	3370
Total Rs. in Lakh	1950	4800	2400	1780	1220	10200





REFERENCES

- Champion, H. G. and Seth, S.K. (1968). A Revised Survey of Forest Types of India, Govt. of India Press, New Delhi, p. 404.
- FSI (2005). Indian State of Forest Report 2005. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2009). Indian State of Forest Report 2009. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2011). Indian State of Forest Report 2011. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2013). Indian State of Forest Report 2013. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2015). Indian State of Forest Report 2015. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2017). Indian State of Forest Report 2017. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- FSI (2019). Indian State of Forest Report 2019. Forest Survey of India, Ministry of Environment, Forest and Climate Change, Dehradun.
- IPCC (2019). Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [PR. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.O. Portner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)], Intergovernmental Panel on Climate Change.
- MoEFCC (2014). Reference Document for REDD+ in India. Ministry of Environment, Forest and Climate Change, New Delhi.
- MoEFCC (2018 a). India: Second Biennial Update Report to the United Nations Framework Convention on Climate Change. Ministry of Environment, Forest and Climate Change, Government of India.
- MoEFCC (2018 b). National REDD+ Strategy India. Ministry of Environment, Forest and Climate Change, New Delhi.
- Richards, M., Bhattarai, N., Karky, B., Hicks, C., Ravilious, C., Timalsina, N., Phan, G., Swan, S., Vickers, B., Windhorst, K. and Roy, R. (2017). Developing sub-national REDD+ action plans: A manual for facilitators. ICIMOD Manual 2017/13. Kathmandu: ICIMOD. <http://lib.icimod.org/record/33672>.



ANNEX 1

List of participants of multi-stakeholders consultation workshop for preparation of Himachal Pradesh State REDD+ Action Plan

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ANNEX 2

List of participants of expert consultation meeting for preparation of Himachal Pradesh State REDD+ Action Plan

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5	Dr. R.S Rawat, Scientist In-charge, BCC Division	ICFRE, Dehradun
6	Dr. Shilpa Gautam, Scientist-D, BCC Division	ICFRE, Dehradun
7	Sh. Nabin Bhattarai, Forest Land scape Restoration & REDD Research Associate	ICIMOD, Nepal
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9	Ms. Trishla Shaktan	FRI (DU), Dehradun
10	Ms. Shambhavi Basnet SSA-REDD+ Initiative	ICIMOD, Nepal
11	Sh. A.K Lal, APCCF	Himachal Pradesh Forest Department
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15	Dr. Shabnam, ADO	Directorate of Agriculture, Shimla
16	Dr. Pankaj Sharma, Sr. Scientific Professional	State Biodiversity Board, Shimla
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24	Dr. S.S. Randhawa, Principal Scientific Officer	HIMCOSTE
25	Sh. Sanjeev Kumar, DCF	HFRI, Shimla
26	Dr. Sandeep Sharma, Scientist-G	HFRI, Shimla
27	Dr. R K Verma, Scientist G	HFRI, Shimla
28	Sh. Dinesh Paul, DCF	HFRI, Shimla
29	Dr. Rajesh Sharma, Scientist G	HFRI, Shimla



ANNEX 3

Relevant Stakeholders of Himachal Pradesh

Government Institutions

1. State Forest Department
2. Agriculture Department
3. Animal Husbandry Department
4. Horticulture Department
5. Rural Development Department
6. Local Administration Department
7. Public Works Department
8. Power and Electricity Department
9. Tourism
10. Science & Technology Department
11. Industries Department
12. Mining Department
13. State Biodiversity Board
14. Department of Biotechnology
15. Department of Irrigation and Public Health
16. Health and Family Welfare Department
17. Department of Food, Civil Supplies and Consumer Affairs
18. Ayurveda Department
19. Electricity Department
20. Department of Town and Country Planning

Science and Technology Institutions

1. Himalayan Forest Research Institute
2. ICAR-Central Potato Research Institute
3. Directorate of Mushroom Research
4. CSIR-Institute of Himalayan Bio-resource Technology
5. Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan
6. Himachal Road Transport Corporation
7. Indian Institute of Technology
8. Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya
9. Himachal Pradesh University
10. Jaypee University of Information Technology
11. Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development, Himachal Unit
12. Shoolini University of Biotechnology and Management Sciences
13. ICAR- Directorate of Floricultural Research



Non - Government Organisations

1. Himalayan Research Group
2. The Society for Technology & Development (STD)
3. Himalyan Organization for Organic Agri-Products Research & Development (HIMOARD)
4. World Wildlife Fund (WWF)
5. Jagriti
6. Chinmaya Organisation for Rural Development
7. Himalayan Apple Growers Society

Private Sectors

1. Resin Industry
2. Katha Industry
3. Herbal Industry
4. Hotel Industry
5. Cement based Industries





ANNEX 4

Ranking of Deforestation and Forest Degradation Drivers and Barrier to Enhancement Activities

Prioritization of Deforestation Drivers

Direct Drivers	Location	Future threat (1-5)	Future Biomass impact (1-5)	Future Forest Area (1-5)	Total Score	Plenary Scoring
Hydropower Projects	All districts except Una and Hamirpur	2	2.5	1	5.5	11
Mining Activities	Solan, Mandi, Kullu, Bilaspur	3	3	1	7	8
Expansion of roads	Shimla, Mandi	4	3.5	2	9.5	7
Urbanization	Shimla, Solan, Dharamshala, Hamirpur, Mandi and Manali	2	1.5	1	4.5	17

Prioritization of Forest Degradation Drivers

Direct Drivers	Location	Future threat (1-5)	Future Biomass impact (1-5)	Future Forest Area (1-5)	Total Score	Plenary Scoring
Mining	Solan (Shillai, Basal), Sirmaur (Deothi, Darlaghat, Sataun), Bilaspur (Barmana)	3.5	3.5	3	10	5
Illicit felling	All districts	3	3	2	8	6
Encroachment	Mandi (Nachar), Kullu (Manali), Shimla (Theog, Kotkhai, Rohru, Kotgarh)	2	2.5	1	5.5	4
Forest fire	Solan, Shimla, Sirmaur, Bilaspur, Mandi, Kangra, Una, Hamirpur	4	2.5	3	9.5	18
Excessive grazing	All districts	2	1	2	5	2
Weed Infestation	Bilaspur, Sirmaur, Solan, Hamirpur, Chamba, Kangra, Mandi	3.5	3	3	9.5	11
Infrastructure	All districts	1.5	1.5	1	4	5
Fodder and fuelwood collection	All districts	2	2	2	6	3



Barriers to Improve Forest Management

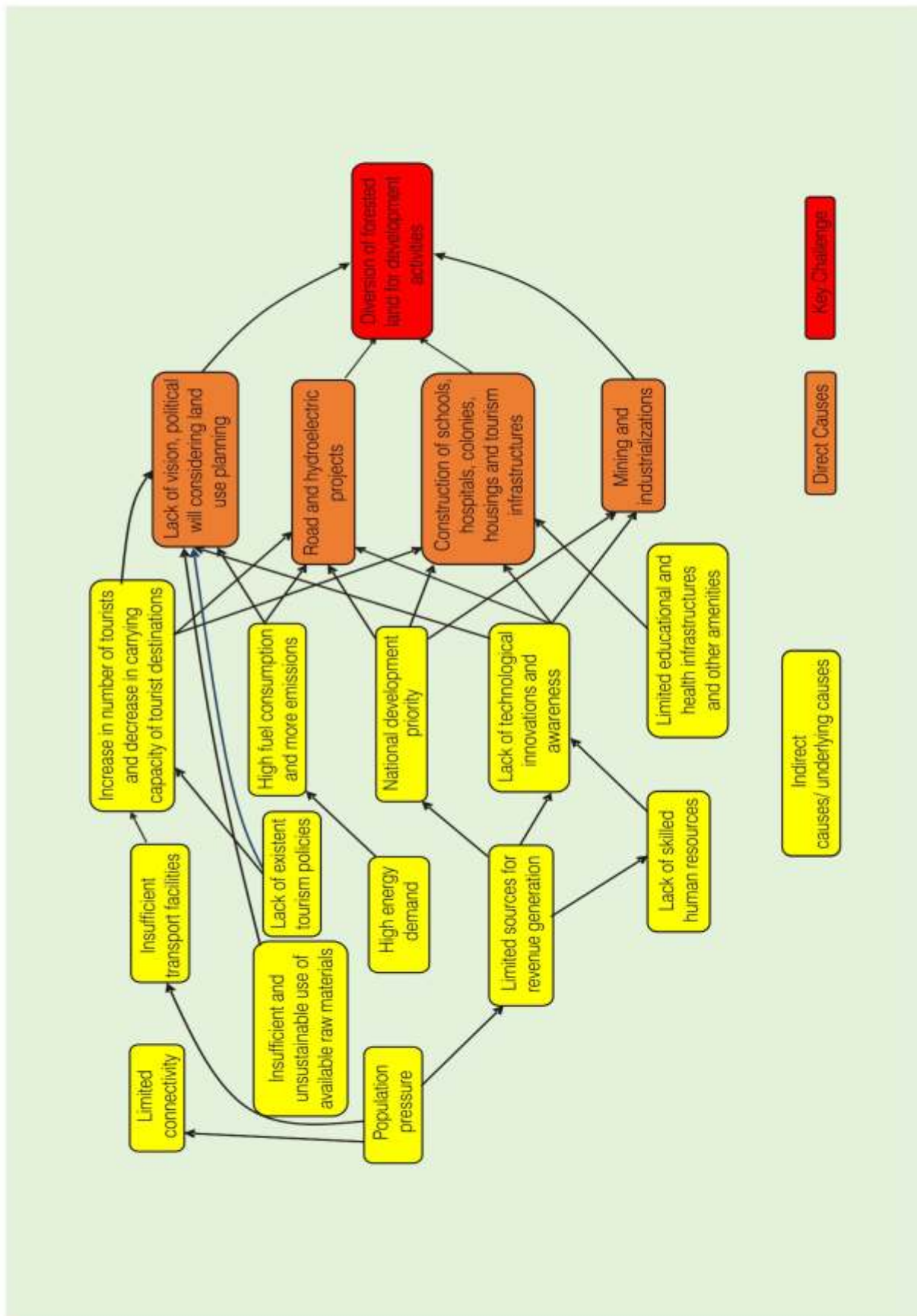
Locations	Future Potential area (1-5)	Future Biomass Impact (1-5)	Total Score	Significant barriers or challenges	Plenary Scoring
Chamba, Kinnaur, Lahaul and Spiti	4	3	7	Lack of suitable rehabilitation of degraded land and quality planting material	13
Kinnaur, Shimla, Chamba, Kangra, Mandi	2	3	5	Encroachment by horticultural and agricultural activities	2
All districts except Lahaul & Spiti, Kinnaur	4.5	4	8.5	Invasive species	11
Hamirpur, Kangra, Bilaspur, Mandi, Sirmour, Manali, Shimla, Chamba, Una	2.5	3	5.5	Forest Fire	13
Lahaul & Spiti, Chamba, Kangra, Mandi, Kinnaur, Kullu and Shimla	1.5	3	4.5	Migratory grazing pressure	1





ANNEX 5

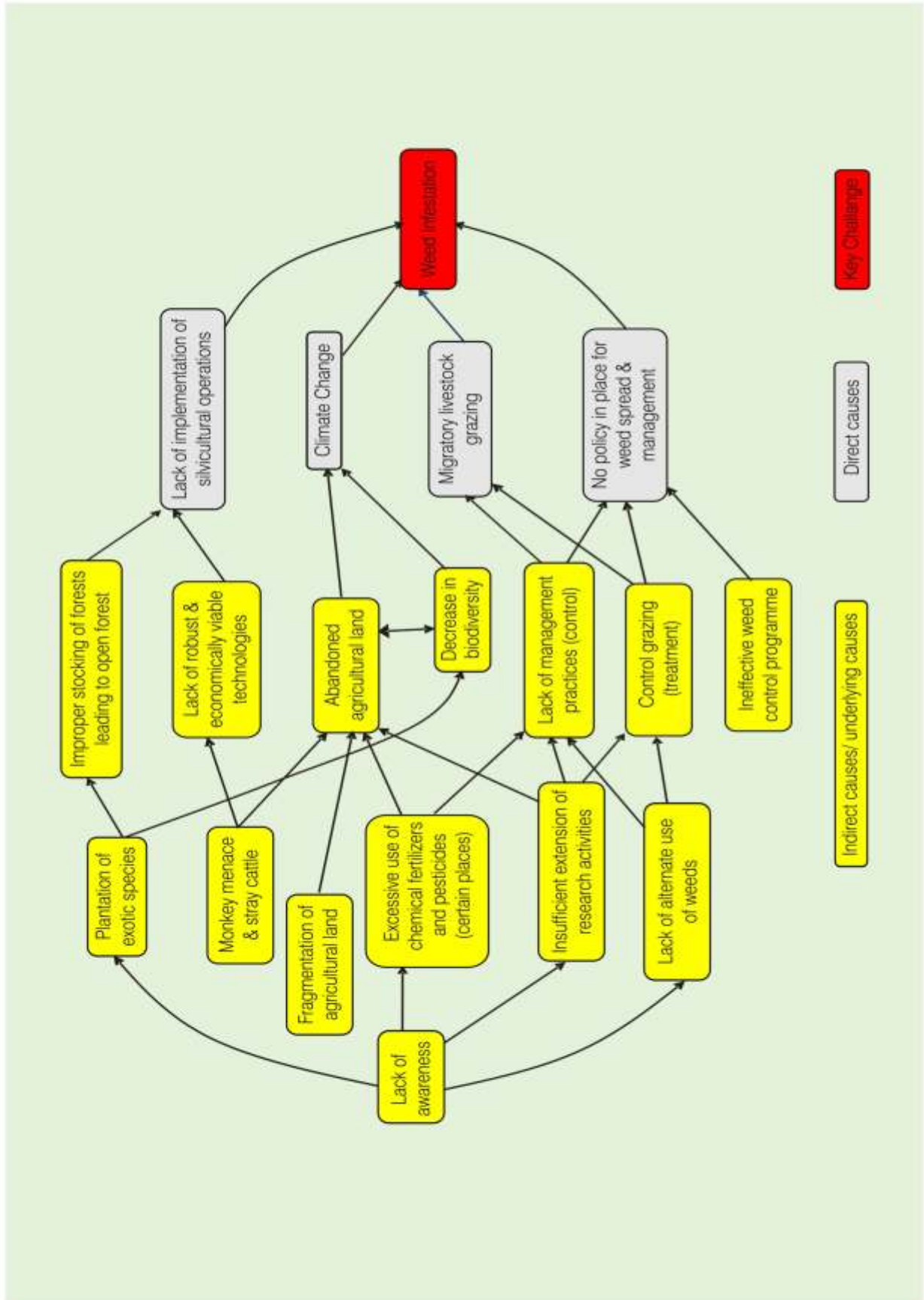
Problem Tree for Deforestation - Diversion of Forested Land for Development Activities





ANNEX 5

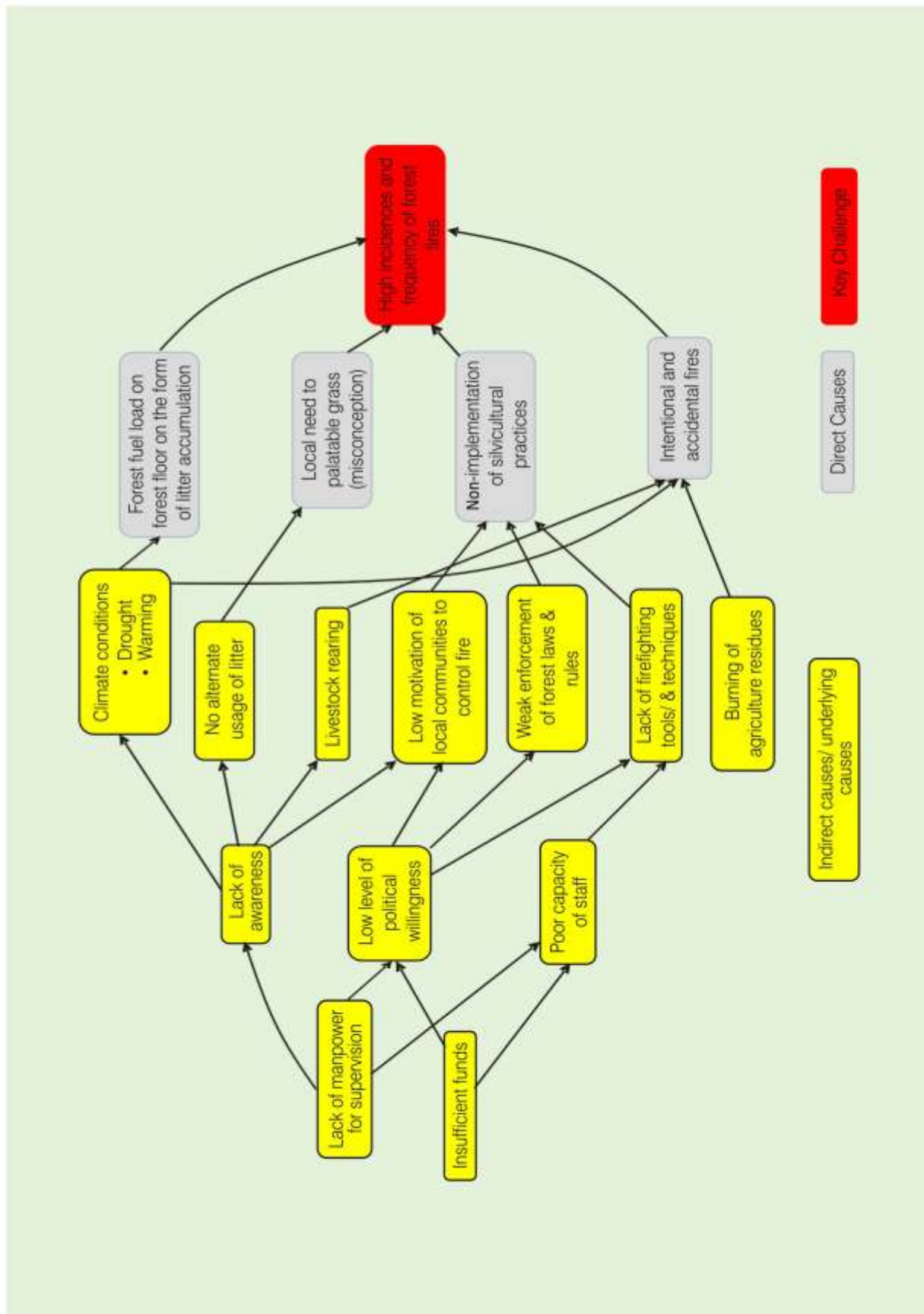
Problem Tree for Forest Degradation - Weed Infestation





ANNEX 5

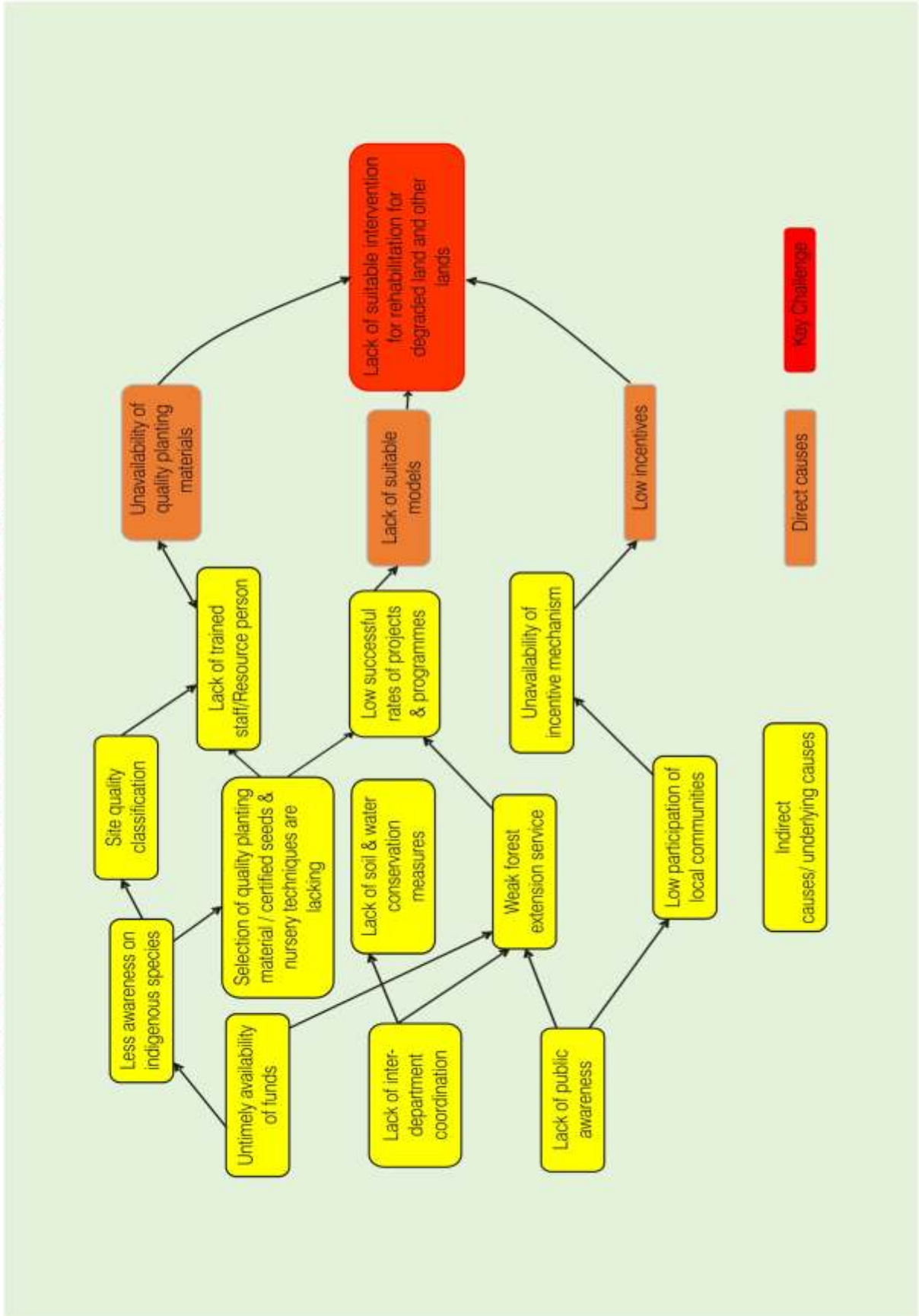
Problem Tree for Forest Degradation - High Incidence and Frequency of Forest Fires





ANNEX 5

Problem Tree on Barriers for Carbon Enhancement
- Lack of suitable Intervention for Rehabilitation for Degraded Land and other Lands





ANNEX 6

Detailed Intervention Packages with Monitoring Plan and Budget

Intervention Package 1 - Improved management of forest land diversion

A. General Information	
IP Name	Improved management of forest land diversion
Drivers or barriers addressed	Drivers of deforestation and forest degradation.
IP Description	The expansion of road networks in Himachal Pradesh in ecologically sensitive areas has increased deforestation, forest degradation, and fragmentation. Road expansion might have a relatively small impact on forest cover but the development of roads are contributing to habitat fragmentation, loss of habitat, etc. For minimizing the impacts of infrastructure development on forests, it is important to capacitate the local communities on the importance of forest and also rehabilitation processes and activities. Moreover, sensitisation of local institutions for proper land use development plans and its execution will reduce deforestation and forest degradation to some extent.
Objectives	The improved management of forest and environmental friendly road construction planning to reduce the deforestation and forest degradation/fragmentation.
Strategies	<ul style="list-style-type: none"> ● Participation of local communities in preparation and implementation of environment management plan/forest diversion management plan ● Providing incentives to the local communities whose agriculture land/private land comes under the diverted section.
Outputs and activities/tasks	<p>Output 1. Community centric environmental plan/forest land diversion plan developed</p> <ul style="list-style-type: none"> ● Formulation of forest diversion plan in consultation with local stakeholders. <ul style="list-style-type: none"> ○ Identification of stakeholders ○ Multi stakeholders consultation meetings ○ Identify the forests area/location on the basis of wildlife habitat, corridors, tree species, water sources, etc ○ Incentive mechanisms for the local communities if diverted section comes under the private land/agriculture land ○ Awareness campaigns and training programmes on forest management to the local communities. ● Assessment on environmental hazards due to development activities in the forested area. <ul style="list-style-type: none"> ○ Clear demarcation of the planned developmental activities with clear routes. ○ Effective monitoring and validation of EIA survey reports ○ Compliance with statutory requirements and other environmental commitments. ● Communities undertake compensatory afforestation/ rehabilitation activities <ul style="list-style-type: none"> ○ Selection of appropriate tree species ● Capacity development of local community institutions



Output 2: Afforestation and rehabilitation sites identified

- Identification of deforested, forest degraded, fragmented and built up areas using Remote Sensing & GIS
- Preparation of clear maps with different land classes
- Prioritization of deforested, degraded and fragmented forest areas.
- Selection of site specific species for afforestation and enrichment plantation
- Training campaigns and awareness programmes on afforestation and rehabilitation

Output 3: Improved monitoring through preparation of maps and spatial analysis

- Preparation of Remote Sensing and GIS based maps.
- Demarcation of forested, deforested, degraded, and built up areas
- Monitoring and implementation of DPR, Catchment Area Treatment Plans, Compensatory Afforestation

B. Feasibility Analysis

Outputs/Activities	Risks or obstacles	Risk Reduction measures	Risk Reduction Targets	Indicators
Community centric environment plan/forest land diversion plan developed	Lack of incentives, awareness	Incentivise the community, Awareness of people about best practices	60 % of incentives is received At least 50 % people participate in awareness campaign	Number of people incentivised and awareness campaigns conducted
Afforestation and rehabilitation sites identified	Lack of motivation and exposure to new technologies	Capacity building and regular and timely training on new technologies	Atleast 6 trainings held on adaptation of new technologies	Number of people trained with new technologies
Improved monitoring through preparation of maps and spatial analysis	Data Deficient	Proper data collection	Updated data collected and maps prepared	Number of different updated maps prepared at different scales for monitoring
Overall Feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation Cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
1	2	1	3	2



C. Safeguard Analysis				
Serious risks	Risk Reduction Measures	Risk Reduction Targets	Indicators	
Low incentives and lack of skilled human resources for implementation	Better incentives and recruitment of new skilled technicians/ manpower	New periodical recruitments on a regular basis are taking place 50-60 % are getting incentivised to promote work	Number of people recruited on yearly basis and number of people incentivised	
Time consuming and lengthy government procedures	Simplification of government procedures	Departmental wise government procedures were simplified	Timely monitoring of simplification of government procedures	
D. Monitoring Protocol				
How does the IP ensure effective provision for monitoring	Regular and effective monitoring by the forest department and also by the implementing partners. Allocation of adequate funding for the monitoring of activities			
Implementing partners	Forest Department and all other line Departments, Public Works Department			
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target		
	Updated spatial maps at a larger scale to monitor Land Use and Land Cover change.	Frequent monitoring of maps along with ground truthing be made.		
	Area of forest recovered after eviction of forest encroachers	Atleast 25 % of encroached forest area recovered		
IP implementation targets	Atleast 6 trainings were held on adaptation of new technologies Spatial analysis and maps were well prepared 50% of area is afforested and rehabilitated			
Monitoring Protocol	Indicators	Source of data or data collection methods		
	Proxy indicators	Forest land diversion plan made Sites identified for afforestation and rehabilitation sites Well prepared maps of land use and land cover map	Field survey, direct field observation, completion reports Field survey, direct field observation, completion reports Regular monitoring of DPR, compensatory afforested sites and other plans.	
	Intervention indicators	% of forest area recovered after eviction of encroachers % number of maps updated % work performed on identified sites for afforestation and rehabilitation sites	Field observations and completion reports Monitoring of updated maps Field observations and completion reports	
Risk reduction indicators	Number of monitoring activities Sites afforested and rehabilitated	Monitoring report and field observation		



E. Budget Plan (5 years)

Introduction Standard government prices and norms will be taken into account
Annual increase in cost 15% to allow for inflation factored in.

Implementa- -tion cost including monitoring	Activity	Budget (Rs. in lakh)	Remarks
	Development of environment management plan/ forest diversion management plan in consultation with stakeholders	250	
	Communities undertake compensatory afforestation/ rehabilitation activities	1450	
	Capacity development of local community institutions	250	
	Development of remote sensing-based maps	80	
	Demarcation of forested, deforested, degraded, and built up areas	150	
	Monitoring and implementation of DPR/EMP, Catchment Plans, Compensatory Afforestation and monitoring	100	
Total Budget (Rs. in Lakh)		2280	





Intervention Package 2 - Minimization of Frequency and Incidence of Forest Fire

A. General Information				
IP Name	Minimization of frequency and incidence of forest fire			
Drivers or barriers addressed	Forest degradation			
IP Description	<p>Forest fire has been one of the biggest threats to the forest in Himachal Pradesh. There are very few cases of accidental fire in the state unintentional and intentional fire is decreasing the quality of the forest.</p> <p>Additionally, due to decreased precipitation and increased temperature magnitude and frequency of forest fire has also increased.</p>			
Objectives	Improved management of natural and plantation forests Better management of forest in close coordination with local communities			
Strategies	Silvicultural prescriptions/ operations on forest fire implemented increased investment for forest fire preventive and treatment measures			
Outputs and activities/tasks	<p>Output 1: Compliance to Forest Working Plans at local level</p> <ul style="list-style-type: none"> ● Timely revision of Forest Working Plans ● Timely execution of silvicultural prescriptions ● Capacity building of SFD and local communities for revision and implementation of Forest Working Plans <p>Output 2: Enhanced capability to deal with threat of forest fire</p> <ul style="list-style-type: none"> ● Early fire warning system ● Fire hazard mapping of vulnerable areas ● Procurement of firefighting tools ● Build capacity for staff of State Forest Department (SFD) and local community for fire management ● Raise awareness of local communities ● Mobilize local communities for firefighting and preventive measures ● Promote alternative use of forest litter (pine needle and invasive species) ● Insurance schemes, incentives and awards for motivating staff of SFD and local communities for forest fire fighting ● Promotion of rain water harvesting structure/techniques ● Construction of rain water harvesting ponds in appropriate places* <p><i>* Harvesting ponds to collect rainwater, to balance the moisture contain in soil and also to recharge the underground water.</i></p>			
B. Feasibility Analysis				
Outputs/Activities	Risks or obstacles	Risk Reduction measures	Risk Reduction Targets	Indicators
Timely execution of silvicultural prescriptions	Data deficiency	Proper data collection and field visits and proper demarcations	Monitoring of demarcations and field visit, meetings per year	Revised Working plans, number of field monitoring visit with field reports



Enhanced capability to deal with threat of forest fire	Unwillingness of the forest staffs and communities	Better motivational incentives and awareness programmes	At least 60% incentives be received for their work 10 awareness programmes per year organised	Number of awareness programmes and people receiving incentives
Overall Feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation Cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
2	2	1	2	1
C. Safeguard Analysis				
Serious risks	Risk Reduction Measures	Risk Reduction Targets	Indicators	
Lack of awareness and manpower	Awareness campaigns	Atleast 3 awareness programmes on yearly basis for regularly updation	Number of trainings conducted	
Anthropogenic fire for developing grasslands	Mobilisation of staff of SFD, establishment of reward mechanism	Yearly rewards for staff of SFD and communities Atleast 3 mobilisation training in fire prone areas	Number of rewards distributed to staff of SFD and communities % mobilisation and training of SFD staff per year	
Biodiversity loss	Modern tools for firefighting and training programmes	5 number of trainings for application of modern fire fighting tools	Number of trainings conducted for application of modern fire fighting tools	
D. Monitoring Protocol				
How does the IP ensure effective provision for monitoring	Regular and effective monitoring by the Forest Department and also by the implementing partners. Allocation of adequate funding for the monitoring of activities			
Implementing partners	State Forest Department, local communities, Panchayati Raj Institutions			
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target		
	Quality of forest after forest fire management (Note: forest quality would be measured based on the density of trees, canopy cover, species diversity, regeneration etc.)	Atleast 40% forest area quality increased		



IP implementation targets	10 awareness programmes per year Identification of forest fire vulnerable areas Five training programmes on forest fire techniques and handling the modern forest firefighting tools Silvicultural prescriptions from revised forest working plans Insurance schemes, incentives and awards delivered to 50% of people Life insurance for all forest fire fighters (communities and staff of SFD)		
Monitoring Protocol	Indicators	Source of data or data collection methods	
	Proxy indicators	Quality of forest after forest fire management	Remote sensing, GIS tools, field observation and completion report
	Intervention indicators	Number of communities provided with insurance	Site visit, procurement database stock entry, invoices
		Number of tools and equipments are upgraded in forest fire control rooms	Field observation and completion report
Risk reduction indicators	Number of awareness and training programmes	Registration/attendance, completion report	
	Area of forest fire vulnerable areas	Number of people awarded and completion report	
	Number of communities awarded/incentivised	Number of people awarded and completion report	
	Documentation and area under zero forest fire	Field observation and completion report	
E. Budget Plan (5 years)			
Introduction	Standard government prices and norms will be taken into account Annual increase in cost 15% to allow for inflation factored in.		
Implementation cost including monitoring	Activity	Budget (Rs. in Lakh)	Remarks
	Timely revision of Forest Working Plans	350	
	Timely execution of silvicultural prescriptions	250	
	Capacity building of SFD and local communities for revision and implementation of Forest Working Plans	250	
	Development of early fire warning system	250	
	Fire hazard mapping of vulnerable areas	100	
	Procurement of firefighting tools	250	
	Capacity build up for staff of SFD and local community for fire management	150	
	Raise awareness of local communities	50	
	Mobilize local communities for firefighting and preventive measure	50	



Promote alternative use of forest litter (pine needle and invasive species)	350
Promotion of rain water harvesting structure/techniques	350
Insurance schemes and awards for motivating forestry staff and local communities for forest fire fighting	200
Total Budget (Rs. in lakh)	2600





Intervention Package 3: Management of Invasive Plant Species

A. General Information	
IP Name	Management of invasive plant species
Drivers or barriers addressed	Forest degradation
IP Description	<i>Lantana camara</i> is one of the most destructive invasive plant species in HP. This species is not only degrading the forest health but also invading the open lands as well as abandoned agricultural land in the state. Finally, it is also affecting in the regeneration of tree species and biodiversity of indigenous species.
Objectives	<ul style="list-style-type: none"> • Control the spreading of invasive alien plant species • Improving the forest quality and health
Strategies	<ul style="list-style-type: none"> • Forest Working Plans prescriptions effectively implemented • State level policies/strategies/plans for management of invasive species developed
Outputs and activities/tasks	<p>Output 1: Weed control programme implemented in forested areas and degraded lands</p> <ul style="list-style-type: none"> • Capacity development for weed management • Weed control measures implemented by communities and SFD (removal, utilization, grazing, etc) <p>Output 2: Invasive plant species controlled</p> <ul style="list-style-type: none"> • Manual control (useful for small infestations) <ul style="list-style-type: none"> • Digging, flooding, destruction, hand-pulling and general destruction • Mechanical control (useful for large infestations) <ul style="list-style-type: none"> • Mowing, hoeing, cutting, tilling, chopping, construction barriers to invasive species using tools or machines • Chemical control <ul style="list-style-type: none"> • Using pesticides, herbicides, fungicides & insecticides • Cultural control <ul style="list-style-type: none"> • Prescribed burning, flooding, planning and seeding • Biological control <ul style="list-style-type: none"> • Grazing, targeted bio-control agents • Mulching and solarisation <p>Output 3: Improved coordination for managing invasive plant species</p> <ul style="list-style-type: none"> • Weed control mainstreamed in State Action Plan on Biodiversity and State Action Plan on Climate Change • Implemented weed control activities in the State through various strategies/plans. • Annual inter-departmental coordination meeting to review progress on invasive species management <p>Output 4: Improved transfer of technology</p> <ul style="list-style-type: none"> • Detailed survey/research on invasive plant species • Identification of new technologies for the management and control of invasive species • Procurement of latest physical devices and equipment's • Provide trainings on handling of the equipment's • Dissemination of knowledge products • Capacity development and awareness campaigns.



B. Feasibility Analysis				
Outputs/Activities	Risks or obstacles	Risk Reduction measures	Risk Reduction Targets	Indicators
Weed control programme implemented in forested areas and degraded lands	Labour intensive and unwillingness by the SFD and communities	Provision of incentives	70% staff of SFD and local communities were incentivised.	Number of staffs of SFD and local communities incentivised
Invasive plant species controlled	Labour intensive and high cost	Provision of incentive measures and support from the government	40% funds received from government to control invasive species. Incentive measures are provided	Funds received hence area controlled from invasive species
Weed control activities in the State through various strategies/plans implemented	Leakage of funds while implementing the activities	Proper monitoring and audit of funds	Number of strategies implemented from funds generated	Regular audit of funds and monitoring of strategies implemented
Improved technology transfer	Elite capture for technology transfer	Transparent selection process	Proper transfer of technology is made	Number of technologies transferred.
Overall Feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation Cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
2	3	1	2	2
C. Safeguard Analysis				
Serious risks	Risk Reduction Measures	Risk Reduction Targets	Indicators	
Forest working plans are not timely revised and hence data deficit	Timely revised of forest working plans	Data collected revised forest working plans	Regular monitoring of revised forest working plans	
Lack of transfer of technology	Awareness of weeds affecting the productivity of land, promotion of the successful agroforestry models	At least 6 awareness programmes on yearly basis were conducted in transfer of technology	% people got aware from awareness programmes per year Number of successful agroforestry models were shared in awareness programmes.	



D. Monitoring rotocol		
How does the IP ensure effective provision for monitoring	Regular and effective monitoring by the Forest Department and also by the implementing partners. Allocation of adequate funding for the monitoring of activities	
Implementing partners	State Forest Department, local communities and Panchayati Raj Institutions	
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target
	Number of capacity building trainings for weed management State Action Plan on Biodiversity and Climate Change implemented	2 trainings were conducted each for Forest Department and local communities Report of regular monitoring submitted
	Dissemination of knowledge products	Regular knowledge products are made and distributed in awareness programmes
IP implementation targets	Identification of technologies and capacity building trainings for weed management were conducted The forest working plans for the Forest Division is updated Increased coordination among inter departments of the state	
Monitoring Protocol	Indicators	Source of data or data collection methods
	Proxy indicators	Number of trainings to Forest Department and local communities for transfer of technology Field observation and study report
	Intervention indicators	Field observation and completion report Field observation and completion report Training aware ness completion report/registration sheet/attendance sheet
	Risk reduction indicators	Field observation and field report



	% state level policies/ strategies/ plans were followed for management of weeds		Field observation and completion report
E. Budget Plan (5 years)			
Introduction	Standard government prices and norms will be taken into account Annual increase in cost 15% to allow for inflation factored in.		
Implementation cost including monitoring	Activity	Budget (Rs. In Lakh)	Remarks
	Capacity development of SFD and communities for weed management	50	
	Weed control measures implemented by communities and SFD (removal, utilization, grazing, etc)	350	
	Weed control mainstreamed in State Action Plan on Biodiversity and State Action Plan on Climate Change	200	
	Implemented weed control activities in the State through various strategies/plans	1250	
	Annual inter-departmental coordination meeting to review progress on invasive species management	50	
	Extension services expanded with appropriate available practices/techniques	50	
Total Budget (Rs. In lakh)		1950	





Intervention Package 4 - Adequate measures developed for rehabilitation of degraded forest lands and other lands

A. General Information	
IP Name	Adequate measures developed for rehabilitation of degraded forest lands and other lands
Drivers or barriers addressed	All drivers and barriers
IP Description	The state has lots of degraded forest lands and other abandoned lands, but appropriate measures were not adopted to restore those abandoned and degraded areas. It is important to identify and use appropriate and adequate measures for improving the forest cover of the state.
Objectives	<ul style="list-style-type: none"> Restoration/rehabilitation of degraded forests and other areas Train forest officials and communities in better forest management.
Strategies	<ul style="list-style-type: none"> Site specific projects developed Incentive mechanism developed Identification of quality planting materials and species
Outputs and activities/tasks	<p>Output 1: Forest and tree cover in degraded forest land including trees outside forest increased</p> <ul style="list-style-type: none"> Stakeholder consultations for identifying and designing specific projects Plans for rehabilitation of degraded forest lands and other lands developed Agroforestry models developed and promoted Exposure field visits Capacity development of SFD Provide incentives for communities for plantation activities Rewarding the communities for improving the forest area and quality <p>Output 2: Appropriate forest resource saving technology introduced and promoted</p> <ul style="list-style-type: none"> Income Generating Activities and employment opportunities for forest dependent communities Support alternative energy technologies (solar, biogas, Improved Cook Stoves, passive heating) Introduction of silage technology for fodder management <p>Output 3: Quality planting material made available and used</p> <ul style="list-style-type: none"> Modern nurseries established Training programme on nurseries management and quality seedlings production Quality planting material raised and transplanted <p>Output 4 : Scientific practices/techniques used for plantation /rehabilitation management</p> <ul style="list-style-type: none"> Using drone technology for mapping and monitoring the status of rehabilitation Preparation on detailed RS/GIS based maps Soil sample analysis Selection of appropriate species QA/QC undertaken



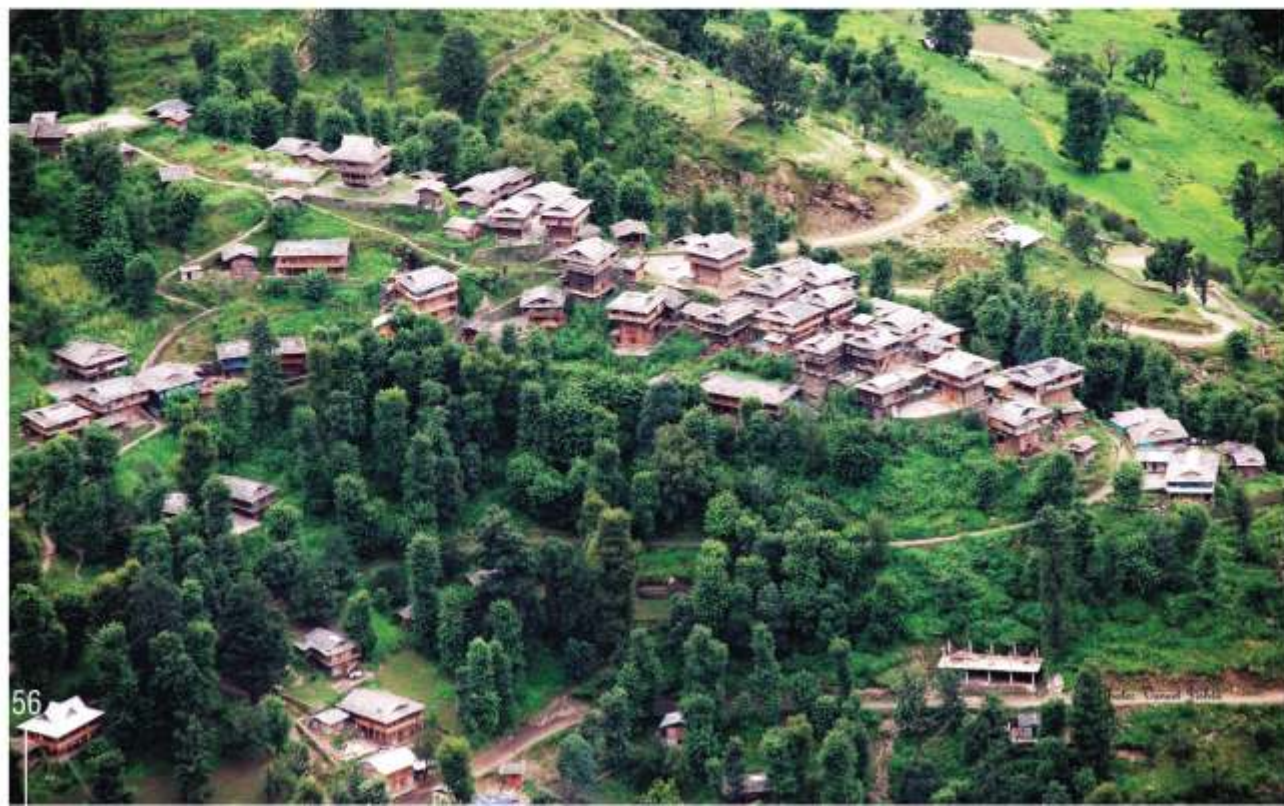
B. Feasibility Analysis				
Outputs/ Activities	Risks or obstacles	Risk Reduction measures	Risk Reduction Targets	Indicators
Incentives and rewards provided to the communities for better forest management	Elite capture on plantations and rewards, Poor households might be excluded	Transparent selection for providing incentives and rewards	Communities/forest officials received reward/incentives for the conservation of forest and other lands	Number of communities/forest officials receiving reward/incentives for conservation of forest
Introduction of silage technology for fodder management	Unwillingness of the local communities	Awareness program mes., establishing demos to convince the communities.	5 awareness programmes along with the demonstration plots were conducted for fodder management	Number of communities adopted silage technology based on awareness programmes
Quality planting material made available and used	Forest officials and communities might not be interested	Provide support in establishing and management of nurseries	50% percent of financial support and 100 % technical support will be provided by the forest department and research institutions	Number of nurseries prepared with quality planting material
Using drone technology for mapping and monitoring the status of rehabilitation	Trained technicians for operating drone and analysis	Provide training on drone operations and analysis	5 trainings were conducted to use latest technology including drone with its application	Number of people trained with the latest technology and data collected from the application of the technology
Overall Feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation Cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
2	3	2	1	3
C. Safeguard Analysis				
Serious risks	Risk Reduction Measures	Risk Reduction Targets	Indicators	
Lack of appropriate technology for the quality planting material	Promotion of quality planting materials and other conservation measures	60% conservation measures were implemented with appropriate transfer of technology	% of quality plating material promoted Successfully developed conservation measures	
Lack of public awareness	Awareness programmes and provision of incentives	70% of forest staff and local communities got aware from regular trainings	Number of trainings conducted % people got incentivised	



D. Monitoring Protocol			
How does the IP ensure effective provision for monitoring	Regular and effective monitoring by the Forest Department and also by the implementing partners. Allocation of adequate funding for the monitoring of activities		
Implementing partners	State Government, Forest Department, Local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Area increased under TOF, agroforestry with proper scientific technology	Field observation and survey and completion report.	
IP implementation targets	<p>At least 60 sq km of degraded land enriched</p> <p>10 modernised nursery developed for quality material</p> <p>5 training programmes for the application of scientific techniques for nursery management</p> <p>50% implementation of silage technology for fodder management by local communities</p> <p>New income generating activities introduced for 40% local communities</p> <p>5 capacity development training programmes on transfer of technology</p> <p>5 awareness programmes along with the demonstration plots were conducted for fodder management</p>		
Monitoring Protocol	Indicators	Source of data or data collection methods	
	Proxy indicators	Area of increased TOF, agroforestry, increased area of degraded land enriched with increased TOF, agroforestry	Field observation and survey, completion report
	Intervention indicators	<p>Number of training programmes per year on nursery management, quality planting material, income generating activities</p> <p>Area of degraded land enriched</p> <p>Number of modern nurseries developed for quality planting material</p>	<p>Registration sheet/attendance and training completion report</p> <p>Field observation and completion report</p> <p>Field observation and completion report</p>
Risk reduction indicators	<p>% nursery established</p> <p>% forest officials and communities trained</p>	<p>% forest area rehabilitated from quality planting material from advanced nurseries</p> <p>Registration sheet/ attendance and training report</p>	



E. Budget Plan (5 years)			
Introduction	Standard government prices and norms will be taken into account Annual increase in cost 15% to allow for inflation factored in.		
Implementation cost including monitoring	Activity	Budget (Rs. in lakh)	Remarks
	Stakeholder consultations for identifying and designing specific projects	100	
	Plans for restoration of degraded forest lands and other lands developed and implemented	1800	
	Agroforestry models developed and promoted	150	
	Exposure field visits	50	
	Capacity development of SFD	50	
	Income generation activity and employment opportunities for forest dependent communities	150	
	Alternative energy technology disseminated (solar, biogas, ICs, passive heating)	200	
	Improved fodder management through silage technology	200	
	Establishment of modern nurseries	200	
	Quality planting material raised and transplanted	200	
	QA/QC undertaken	120	
	Use of drone technology for mapping and monitoring the status of rehabilitation	150	
Total Budget (Rs. in lakh)		3370	





Multi Stakeholder Consultation Workshop for Preparation of Himachal Pradesh State REDD+ Action Plan





Glimpses





Glimpses





Expert Consultation Meeting for Preparation of Himachal Pradesh State REDD+ Action Plan





- Indian Council of Forestry Research and Education, Dehradun
- International Centre for Integrated Mountain Development, Kathmandu
- Himachal Pradesh State Forest Department, Shimla